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MASTERS DISSERTATION

Investigating the Factors That Contribute to In-App Purchases in Online Gaming: The Stimulus-Organism-Response Model

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ABSTRACT

Advancements in online payment mechanics has revolutionised the monetisation of online games. One such method known as In-App Purchases (IAPs) - small purchases of virtual goods for real world currencies, has become a popular method of increasing the profitability of online games. In-App Purchases are made only by small percentages of players in a game and the reasons influencing players to make In-App Purchases vary. Exploring the influencers of players online purchase intent in online games may assist game developers in increasing players' willingness to make In-App Purchases. The monetisation mechanics of games and consumers' willingness to make online purchases are an important focus in the online gaming industry when determining the profitability of a game. Thus, coming to understand the monetisation mechanics of a game and the way it influences consumers online purchase intent can be useful to game developers and marketers when developing new games. The purpose of this study was, thus, to assist both game developers and marketers in understanding the influencers of online purchase intent in online games, in order to better create and market more profitable online games.

The Stimulus-Organism-Response (S-O-R) model was used to better understand In-App purchasing behavior, where Stimulus refers to game characteristics, Organism refers to gameplay experience that could lead to the Response resulting in Online Purchase Intent. The factors identified that contributed to this response include: Active Control, Reciprocal Communication, Social Identity, Skill and Challenge which constitute the Stimulus constructs of the S-O-R model; the factors which constitute Response include: Flow, Cognitive Involvement and Affective Involvement. The model was tested using an online survey and tested through the use of Partial Least Squares Structural Equation Modelling software.

The results of the study provide support for the conceptual framework and indicate that Online Purchase Intent may be most influenced by the way players personally identify with a game, and how much of a challenge the game presents. The results also indicate that emotional involvement with a game has a significant positive influence on Online Purchase Intent and that online purchases may be impulse purchases. The findings of this study imply that game developers may be able to influence Online Purchase Intent by increasing the level challenge found in games. Additionally, marketers may be able to influence online purchases through the use of emotional appeals in game advertisements and by offering limited edition sales of In-App Purchases. Future research related to this study should explore which emotions are the greatest influencers of Online Purchase Intention, and how these emotions influence the willingness to make In-App Purchases.

Keywords: *Online gaming, Online Purchase Intention, In-app purchases, Stimulus-Organism-Response model, Flow, Descriptive Research, Online Surveys, Structural Equation Modelling*

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DEFINITION OF KEY TERMS:

ARM (model) – Acquisition Retention Monetisation model

A gaming monetisation model that proposes online purchases in games are linked to the acquisition and retention of players.

CME – Computer Mediated Environment

Alternate (virtual) realities created through computer interfaces such as web pages, SNSs and online games.

F2P – Free to Play

A gaming business model that offers numerous in-game purchases to players.

IAP – In-app Purchase

A purchase made in-game for hard (real world) currency.

I-O (model) – Input Output model

A simple environmental psychology model that proposes that a stimulus affecting an individual will yield a response from that individual.

MMO – Massive Multiplayer Online (gaming)

A gaming phenomenon whereby large numbers of players engage in co-operative gameplay on an online gaming platform

OPI – Online Purchase Intent

The willingness to purchase online goods

SNS – Social Networking Site

An online platform primarily used for engaging in social activities with other members of the SNS. Examples include Facebook, Twitter and LinkedIn.

S-O-R (model) – Stimulus Organism Response model

An environmental psychology model and is used to analyse the mediating effect of emotional responses on the relationship between the environment and an individual's behaviour.

CHAPTER ONE: INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

The world of online gaming is a large, rapidly growing industry that has become highly profitable. In 2017, the total value of the online gaming industry was estimated at $78.61 billion (Statista, 2017). In online games, the largest streams of income often come from the sale of in-game virtual goods called In-App Purchases (IAPs) (Alha, Koskinen, Paavilainen, Hamari & Kinnunen, 2014). IAPs are only purchased by a small number of players in a game (Fields & Cotton, 2012) and the majority of players play online games without making any IAPs. The study of Online Purchase Intent (OPI) for IAPs in online games, as well as the influencers of Online Purchase Intent for IAPs, can assist in understanding why consumers make IAPs and thus how the player base of non-paying players may be monetised. Thus, the purpose of this research study is to investigate the factors which influence the Online Purchase Intention of In-App Purchases in online games for players of online games.

The growth of the gaming industry is exponential and future projections only see it continuing to grow (Lee, 2013; Statista, 2017). The gaming industry is also a rapidly evolving one, with games becoming far better and more realistic overtime (Hahl, 2014; Lee, 2013; Narinen, 2014). The rapid growth of the industry, and the technological advancements therein, have also led to the development of a number of new business models in order to monetise games, such as the retail gaming industry model and the free-to-play business models (Hahl, 2014).

The Retail gaming business model involves the player making a one-time purchase of a game for a set amount. However, with the development of Massive Multiplayer Online (MMO) gaming, such as League of Legends and World of Warcraft, large gaming severs have developed a Subscription model of gaming (Kuusisto, 2014). The Subscription mode, also known as the pay-to-play (P2P) model, charges players a subscription fee for a set period of play time, usually on a month-to-month basis. However, such models draw great criticism due to the price of purchasing the game, paying a monthly subscription and the data costs required to play (Kuusisto, 2014; Narinen, 2014; Vankka, 2014).

The Free-to-Play (F2P) model of gaming is a more recent gaming business model, adapted from MMO gaming, that has become increasingly popular (Alha *et al.*, 2014; Kuusisto, 2014; Narinen, 2014, Xicota, 2013). The F2P model involves offering the game client to players for free but then offering a number of virtual sale items known as In-App Purchases (Vankka, 2014). IAPs are virtual purchases made in a computer or mobile application, such as an online game, without having to go to an online store such as the Google Play Store (Vankka, 2014). In online games, IAPs can include (but are not limited to) additional gaming lives, extended playtime in a game, unique weapons and armour, or unlocking additional gaming levels. IAPs are generally optional and improve the gaming experience, offering the paying player more enjoyment in the game (Vankka, 2014).

The presence of an IAP is often the only source of income generation for F2P games. However, the research into what drives online purchases is conflicting and extant literature points to a number of, sometimes mutually exclusive, drivers of Online Purchase Intent including player experience, social influence and player loyalty (Cole & Griffiths, 2007; Hahl, 2014; Hoffman & Novak, 2009; Huang, 2012; Marchand & Hennig-Thurau, 2013; Mathwick & Rigdon, 2004; Narinen, 2014, Vankka, 2014). The disparity in drivers of OPI has led to the development of a number of conceptual models analysing the influences of online purchase intent in online gaming (Hoffman & Novak, 1996; Huang, 2012; Narinen, 2014) such as the Acquisition-Retention-Monetisation (ARM) model (Hamari & Lehdonvirta, 2010; Narinen, 2014), the Network Navigation in Hypermedia Computer Mediated Environments (CME) model, more commonly known as the *Flow* model (Hoffman & Novak, 1996), and the Stimulus-Organism-Response model (Huang, 2012) which was adapted in this study.

The Stimulus-Organism-Response (S-O-R) model was developed by Mehrabian and Russel (1974) for use in environmental psychology, and has since been prevalent in the study of Consumer Behaviour (Jacoby, 2002). Huang (2012) adapted the S-O-R model to investigate the influence of social interactions in Social Networking Sites (SNSs), specifically focusing on the Online Purchase Intent for In-App Purchases in Social Networking Sites (such as Facebook). The S-O-R model for SNSs incorporates aspects of the ARM model and Flow model into a single model and classifies them in the categories of Stimulus, Organism and Response (Huang, 2012). However, this model analyses the influencers of purchase intent for all available In-App Purchases in a Social Networking Site and has not been directly applied to study of Online Gaming.

The S-O-R model is flexible and permits modifications, additions or deletions to the basic model (Jacoby, 2002). As the S-O-R model used by Huang (2012) was adapted specifically for use in analysing Online Purchase Intention in Social Networking Sites, the model could not be directly applied to online gaming. Thus, two additional constructs were identified, namely Skill and Challenge, in order to adapt the model for use in online gaming (Hoffman & Novak, 2009; Mathwick & Rigdon, 2004). The constructs of Skill and Challenge are both present in gaming, where Challenge refers to the level of difficulty experienced when playing a game, and Skill refers to a player's ability to meet that level of difficulty.

The S-O-R model proves useful to this study for four reasons. Firstly, it provides a sound theoretical justification for using the characteristics of a CME as environmental stimuli (Parboteeah, Valacich & Wells, 2009). Secondly, it is a flexible model that easily permits modifications and adaptations to be made (Jacoby, 2002). Thirdly, it allows for the analyses of OPI for IAPs with regards to both the characteristics of a game and the experience of playing it. Lastly, it allows for the analyses of the relationships between characteristics of games and their players, the state of mind elicited by the playing of that game, and the reactions of players as a result of that state of mind (Huang, 2012; Parboteeah *et al.*, 2009). Simply put, it provides a means to link the playing of a game and the experience of playing that game to OPI.

This study developed a conceptual model, the S-O-R model for Online Gaming (seen in Figure 1.2 below), in order to investigate the factors which influence Online Purchase Intent of In-App Purchases in online games for players of online games. The study sought to answer the following research questions:

RQ1: Can the Stimulus Organism Response model be effectively applied to Online Gaming?

If the research question was proven true, the inclusion of the constructs Skill and Challenge (Mathwick & Rigdon, 2004) to the S-O-R model lead to the following research questions:

RQ2: Do Skill and Challenge also contribute to the Flow and the Online Purchase Intent of In-app Purchases in online gaming?

RQ3: Which factors of the S-O-R model for Online Gaming contribute the most to the Online Purchase Intent of In-app Purchases in online gaming?

Through the use of the S-O-R model for Online Gaming, the study sought to develop a sound theoretical model which could be used to analyse the Online Purchase Intention as well as its influencer in online games. Additionally, the intention of this study was to assist game developers and marketers in understanding the drivers of Online Purchase Intent in online games and thus develop more effective methods to develop and market virtual goods, and influence the Online Purchase Intent of those goods. Furthermore, as the study was conducted in South Africa, it sought to provide some insight into the online gaming industry in a South African context.

The sections in this chapter form the foundation of this study and serves as guide for the chapters to follow. This chapter begins with a discussion of the theoretical background of the study followed by a summary of the research questions and hypotheses developed. Thereafter, follows a summary of the methodology used this study, and a discussion of the contributions of this study. The chapter concludes by detailing the outline of the remainder of the study.

1.2 BACKGROUND TO THE STUDY

This section first discusses the online gaming industry, the business models employed in the industry and how those models monetise games. This is followed by a discussion of the S-O-R model, specifically focussing on the S-O-R for Online Social Media, and details why the S-O-R model is suitable for use in this study. Lastly, this section detailed how the S-O-R model was adapted for Online Gaming through the inclusion of the constructs Skill and Challenge.

1.2.1 The Online Gaming Industry

The gaming industry has experienced massive growth in recent years and, with the simultaneous growth of the internet, has begun to move into an online sphere (Hahl, 2014; Lee, 2013). Many games are now created to be played either in conjunction with or solely in an online environment. These online environments are often referred to as

Computer-Mediated Environments (CME) and can be thought of as being alternate realities created through computer interfaces such as web pages, SNSs and online games (Hoffman & Novak, 1998; Siddiqui & Turley, 2006).The Retail gaming business model of a once-off purchase has been replaced by models that seek to ensure a continued stream of revenue beyond the original purchase. This model of gaming has come to be known as Subscription (P2P) gaming and first arrived with the development of Massively Multiplayer Online (MMO) gaming (Kuusisto, 2014).

MMO gaming requires a consumer to first acquire the game, either through purchase or for free, and then charges a subscription fee to allow play over set periods of time. This model of gaming is often expensive, in terms of subscription and data costs, to consumers but is still one of the most successful and ever-growing gaming models (Debeauvais, Nardi, Lopes, Yee & Ducheneaut, 2012). Examples of MMOs include World of Warcraft, League of Legends, Guild Wars and Star Wars: The Old Republic.

MMO gaming has formed the base for many subsequent gaming business models and was instrumental in the development of IAPs (Hahl, 2014; Kuusisto, 2014). These purchases were often for smaller amounts and were known as micro-transactions. Microtransactions are paid for with real currency, or 'hard currency', as opposed to an in-game currency, or 'soft currency' (Hahl, 2014). MMO gaming and the development of micro-transaction capabilities has led to the development of one of the most successful business models of gaming to date, the Free-to-Play (F2P) model (Alha *et al*., 2014; Kuusisto, 2014; Narinen, 2014, Xicota, 2013).

1.2.1.1 The Free-to-Play model of gaming

F2P gaming, which is popular in the online gaming environment, involves offering the game, known as the 'gaming client', for free and then offering a number of micro-transactions called In-app Purchases (IAPs) to players throughout the course of gameplay (Kuusisto, 2014). The IAPs are always optional and a player is free to continue playing without spending hard currency. However, IAPs are often made to allow significantly improved gameplay and, subsequently, a better gaming experience (Hahl, 2014).

There are two additional F2P gaming models and each deviates slightly from the model described above. The 'Freemium' model of gaming offers the gaming client for free and then offers a number of IAPs. However, IAPs are far more crucial to gameplay in a freemium game and a player's willingness to make IAPs may influence whether a freemium game is played or not (Alha *et al*., 2014). The 'Paymium' model of gaming charges for the gaming client and also offers a number of IAPs, however, these IAPs often have little impact on gameplay (Hahl, 2014).

The success of F2P gaming relies largely on income from IAPs as this is often the only source of income for these games (Alha *et al*., 2014). As such, there is extensive focus on income generation or 'monetisation' in F2P games.

1.2.1.2 Monetisation of F2P games

F2P games have limited sources of income namely, IAPs, subscription fees and in-game advertisements. IAPs are often the largest income stream for online games and many online games offer regular prompts for IAPs throughout the course of gameplay (Alha *et al*., 2014). However, IAPs are shown to be purchased only by approximately 3% - 5% of the player population in any online social game (Fields & Cotton, 2012). In addition, only a small percentage of paying players will make large purchases of IAPs while the majority make much smaller IAPs (Vankka, 2014). Therefore, understanding how to monetise the player base is crucial to the success of any game.

The willingness to purchase an IAP or the online purchase intent (OPI) is thought to be influenced by a number of factors which include game features (Hahl, 2014; Narinen, 2014; Vankka, 2014), player experience (Hoffman & Novak, 2009; Marchand & Hennig-Thurau, 2013; Mathwick & Rigdon, 2004), social influence (Cole & Griffiths, 2007; Huang, 2012) and player loyalty (Narinen, 2014). Many of these influencers are also thought to be linked and therefore may work together to affect OPI (Lovell, 2013; Narinen, 2014). For example, a game with attractive gaming features and an enjoyable player experience is thought to increase player loyalty which in turn influences OPI. Research into the drivers of OPI has yielded a number of conceptual models showing the relationships between the influencers and OPI (Hamari & Lehdonvirta, 2010; Hoffman & Novak, 1996; Huang, 2012; Lee, 2013; Narinen, 2014).

One such model, The ARM model, can easily be applied to the above example. The ARM model or ‘Acquisition-Retention-Monetisation” model proposes that a player is first attracted to a game by its features (Acquired), is willing to continue playing because of an enjoyable gaming experience (Retention), and is then more likely to make IAPs (Monetisation) (Hamari & Lehdonvirta, 2010; Lee, 2013; Narinen, 2014). The ARM model follows a funnel design as it proposes that, within each stage, the number of players will decrease (Lovell, 2013). However, the model is simplistic and ignores other crucial drivers of OPI such as social influence.

A more advanced model, Network Navigation in Hypermedia CME model or the Flow model, first proposed by Hoffman and Novak (1996) uses the concept of flow to explain the processes involved in an online experience. Flow, which is described as being an intrinsically motivated optimal state of mind (Csikszentmihalyi, 1975; Csikszentmihalyi, 1990), is thought to be an engrossing, highly enjoyable experience that leads to the development of positive emotions (Hoffman & Novak, 1996; Huang, 2003; Guo & Barnes, 2009). The flow model has since been improved and adapted (Hoffman & Novak, 1996; Novak, Hoffman & Yung, 2000; Hoffman & Novak, 2009), and can now be applied to SNSs or online gaming. The model looks at a number of antecedents of flow such as how involved a consumer is, how they choose to interact on the online environment, how they are able to control their online environment, and how these antecedents in turn influence the construct of flow itself (Hoffman & Novak, 1996). The model then also looks at how flow in turn can influence other constructs such as a consumer’s ability to learn, the level of enjoyment experienced and their willingness to make purchases online (Hoffman & Novak, 2009).

The concept of flow is therefore quite useful in relating game experience to purchase intent. The flow model is, however, very complex and is better suited to the analysis of flow itself. Therefore, this study makes use of another model, the Stimulus-Organism-Response (S-O-R) model, which is less complex and can easily be applied to the study of OPI (Huang, 2012; Jacoby, 2002).

1.2.2 The Stimulus-Organism-Response Model

The Stimulus – Organism – Response model is an environmental psychology model and is used to analyse the mediating effect of emotional responses on the relationship between the environment and an individual's behaviour (Mehrabian & Russel, 1974; Mehrabian & Russel, 1980s). The model has often been used in consumer behaviour studies as it is a useful framework to investigate the mediating effects of emotional responses to the relationship between consumer-targeted stimuli and consumer's subsequent behaviour (Donovan & Rossiter, 1982; Jacoby, 2002; Eroglu, Machliet & Davis, 2003; Jang & Namkung, 2009; Parboteeah *et al.*, 2009; Kim & Lennon, 2013).

The S-O-R model implies that there are three stages in the process of an individual responding to stimuli. The first stage, Stimulus, is when an individual is exposed to a source of stimuli such as music, promotional advertisements or event alerts (Huang, 2012). The second stage is Organism, and involves the internal response of an individual to the stimulus in terms of how they think and feel (Jacoby, 2002). The third stage, Response, involves the external response of the individual as a result of exposure to the Stimulus and Organism stages (Jacoby, 2002; Huang, 2012).

The S-O-R model proves useful for this particular study for three reasons. Firstly, the model provides sound theoretical justification for using web characteristics as environmental stimuli (Parboteeah *et al.*, 2009). Secondly, it allows the link between a consumer's online experience and their virtual goods consumption to be analysed (Huang, 2012). Third, it allows for the study of virtual goods consumption as a state of mind that results from the exposure to environmental stimuli (Parboteeah *et al*., 2009). The S-O-R model was adapted by Huang (2012) in a study to examine the effects of interactive and social features on users' online experiences and their purchase intention of virtual goods from a SNS. This model can be observed in Figure 1.1 below:

FIGURE 1.1: THE S-O-R MODEL

Basic S-O-R Model	Stimulus	Organism	Response
S-O-R model for SNSs (Huang, 2012)	*Interactivity:* Active Control Reciprocal Communication Social Identity	Flow *Involvement:* Cognitive Involvement Affective Involvement	Online Purchase Intent

As Huang's (2012) study focuses on SNS's, Facebook in particular, stimuli chosen for the model include the interactive features of Facebook, grouped as Active Control and

Reciprocal Communication, and social factors, grouped as Social Identity. Organism has been operationalised as Involvement and Flow, and Response as Online Purchase Intention. Each of the constructs are discussed in the sections to follow.

1.2.2.1 Interactivity and Online Social Identity

Huang (2012) classifies the stimuli in the S-O-R model into two groups: interactivity and social factors. Interactivity can be defined as the degree to which participants in a communication process have control over the exchange and can switch roles in their mutual discourse (Hoffman & Novak, 1996; Fortin & Dholakia, 2005; Huang, 2012). Thus, in order for any form of communication to be considered interactive, the participants in the communication process must be able to control who they are able to interact with in addition to having two-way communication channels. Interactivity is therefore, divided into two constructs, namely Active Control and Reciprocal Communication (Huang, 2012).

Active control can be defined as the ability of an individual to choose who they interact with, when to interact and which information to take in when engaging in an online space (Lowry, Spaulding, Wells, Moody, Moffit, & Madariaga, 2006). The ability to make decisions in determining outcomes or goals is considered to be an important factor in creating a compelling online experience (Ghani & Deshpande, 1994). This is because people tend to feel and behave more positively when they perceive to have more control over their environment (Csikszentmihalyi, 1990; Ghani & Deshpande, 1994). On Facebook, active control would refer to a Facebook user's ability to adapt their newsfeed, select which people to befriend, choose who to interact with, and select which Facebook applications to use. In an Online Gaming context, active control would refer to a player's ability to make gameplay choices and control which players they can interact and communicate with.

Reciprocal Communication, the second interactivity measure, can be defined as the ability to communicate between two or more entities (Jiang, Chan, Tan & Chua, 2010). Reciprocal communication implies a two-way communication stream where the participants involved are able to freely communicate with each other. Reciprocal Communication is thought to reduce relationship uncertainty (Berger & Calabrese, 1975) and strengthen the relationships between participants (Duncan & Moriarty, 1998). Therefore, effective reciprocal communication may influence greater response from participants. Reciprocal communication in Facebook would take the form of the messenger function, the ability to comment on statuses and the ability communicate with other Facebook app users. In Online Gaming, reciprocal communication would refer to the ability to freely communicate with another player and to have that player able to return any form of communication.

Social Identity, the only social factor in the S-O-R model, can be defined as a user's self-esteem and commitment to groups, as well as the way they identify with a particular group in terms of the characteristics attributed to that group (Dholakia & Chiang, 2003; Dutton, Dukerich & Harquail, 1994; Kwon & Wen, 2009; Yujong, 2008). Social Identity therefore refers to the way an individual can identify with a particular

group based on their ability to recognize similar characteristics to their own, and subsequently commit and immerse themselves into that group. Identification with a group and assimilation into that group can positively influence the emotional and behavioural responses of members of that group (Markus & Wurf, 1987). Social Identity in Facebook would refer individual Facebook profiles, the pages (of online communities) joined and any social apps used. In Online Gaming, social identity would refer to a player's ability to relate to player groups, the ability to join player groups and the level of commitment to a specific player group. These player groups are often referred to as 'guilds' and players within the group work together to accomplish game objectives (Debeauvais *et al*., 2012; Narinen, 2014).

The Stimulus constructs *Active Control*, *Reciprocal Communication* and *Social Identity* all influence the Organism constructs Flow (Huang, 2012). As stated above greater levels of *Active Control*, *Reciprocal Communication* and *Social Identity* will influence increased response. Therefore, all Stimulus constructs have a positive influence on Flow. The constructs for the Organism stage of the model, which includes Flow and Involvement, is discussed in the next section.

1.2.2.2 Flow and Involvement

In the S-O-R model, Organism refers to an individual's organic experiences as a consequence of exposure to an environmental stimulus, and includes aspects such as flow, involvement, cognitive network and schema (Huang, 2012). Therefore, Organism can be thought of as the thoughts and emotions that are experienced as an individual interacts with and reacts to Stimuli. Mathwick and Rigdon (2004) argue that stimuli induce a state of mind that may affect experiential outcomes either positively or negatively. Memorable experiences may serve to strengthen relationships and influence consumer attitudes (Deighton & Grayson, 1995). A positive experience may then influence a person to increase their level of interaction with the stimuli and, as a result, become more involved with it (Huang, 2003). This implies that in Online Gaming, a positive reaction to a game may increase a player's willingness to play or their 'involvement' with that game. The constructs of Organism, *Affective Involvement* and *Cognitive Involvement* have been shown to yield a strong influence on purchase intention (Huang, 2012; Jiang *et al*., 2010). Therefore, higher levels of involvement with a game may influence a player's OPI.

The first Organism construct, *Flow*, was first proposed by Csikszentmihalyi (1975) and was described as being an intrinsically motivated optimal state, or as a holistic sensation felt when acting with total involvement. Flow has since been extensively studied and modelled (Hoffman & Novak, 1996; Novak, Hoffman & Yung, 2000; Hoffman & Novak, 2009), and has also been applied to many studies in online experience (Mathwick & Rigdon, 2004; Schneider & Cornwell, 2005; Sweetser & Wyeth, 2005; Korhonen, Montola & Arrasvuori, 2009). Flow is seen as being an engrossing and enjoyable experience that can lead to the development of positive emotions while in a state of flow (Guo & Barnes, 2009; Hoffman & Novak, 1996; Huang, 2003). Individuals in a state of flow are more likely to become increasingly immersed in an online environment and therefore become more focused on online interactions

(Hahl, 2014; Hoffman & Novak, 2009; Huang, 2012). Flow is also linked to greater learning, increased curiosity and positive experiences (Hoffman & Novak, 2009). As a result, a state of flow may lead to greater levels of involvement.

Involvement can be defined as a motivational state that affects consumers' attention, comprehension processes and overt behaviours (Celsi & Olsen, 1988). Park and Young (1986) proposed that involvement be defined as two distinct constructs: *Cognitive Involvement* and *Affective Involvement*. Cognitive Involvement is induced by utilitarian or cognitive motives while Affective Involvement is derived from value-expressive or affective motives (Putrevu & Lord, 1994). Therefore, Cognitive Involvement can be seen as the cognitive response triggered by a stimulus while Affective Involvement can be seen as the emotional response triggered by the same stimulus.

Involvement is shown to be able to influence consumer behaviour (Jiang *et al.*, 2010) and thus has an influence on purchase intention (Eroglu *et al.*, 2003). This implies that it is a player's level of involvement with a game that will influence their OPI. Affective Involvement has been shown to have the strong positive influence on OPI, while Cognitive Involvement has been shown to have a negative influence on OPI (Huang, 2012). This implies that the feeling an online experience elicits is more likely to result in an online purchase than immersion into the experience or thought processes around the experience. A player in an online social game may be more likely to make IAPs when experiencing positive emotions and a sense of immersion in the game world (Hahl, 2014). OPI, the Response construct for the S-O-R model for SNSs, is detailed in the next section.

1.2.2.3 Online Purchase Intent

The final stage of the S-O-R model is Response and made use of the construct Online Purchase Intent (OPI). OPI can be defined as a customer's willingness to purchase products or services through a website (Chen, Hsu & Lin, 2010). The study of purchase intention can be unique to each study and the particular elements being analysed (Mirabi, Akbariyeh & Tahmasebifard, 2015). In the S-O-R model for SNSs, OPI is influenced by involvement and the results of the study show that OPI is positively influenced by Affective Involvement while it is negatively influenced by Cognitive Involvement (Huang, 2012).

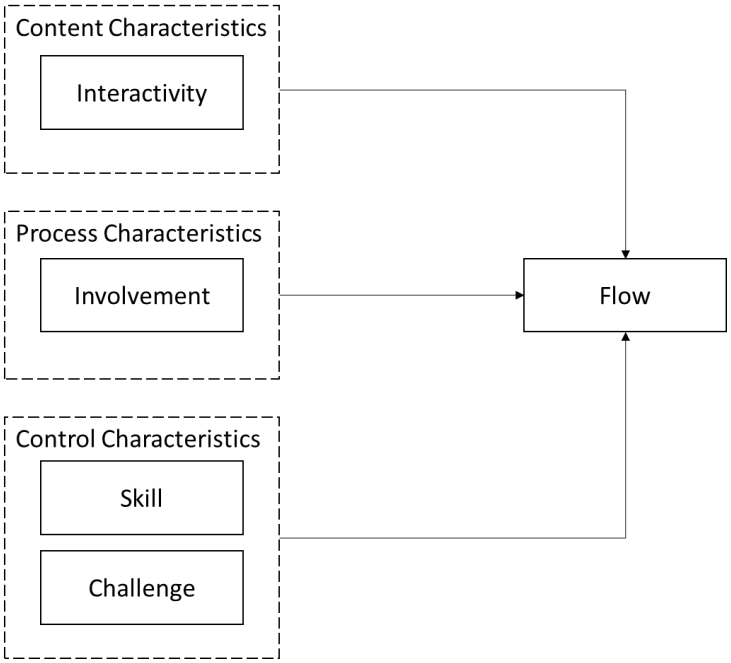
The S-O-R framework is flexible and permits countless numbers of modifications, additions or deletions (Jacoby, 2002). As such, it is possible to adapt the S-O-R model discussed thus far for use in Online Gaming. In this regard, the gaming characteristics of Skill and Challenge, known as Control Characteristics in the Flow model (Hoffman & Novak, 1996), which are prevalent in online games, will be discussed for use in the model in the section to follow.

1.2.3 Control Characteristics for Online Gaming

In order to adapt the S-O-R model for use in online gaming, additional constructs were identified pertaining to online games, namely the constructs of Skill and Challenge

(Mathwick & Rigdon, 2004). These constructs form a part of the Flow model (Hoffman & Novak, 1996), which was a model also used by Huang (2012) in developing the S-O-R model for SNSs. The Flow model is composed of three sets of characteristics: Content Characteristics, Process Characteristics and Control Characteristics (Hoffman & Novak, 1996) which can be seen in Figure 1.2 below:

FIGURE 1.2: THE THREE CHARACTERISTICS OF FLOW



SOURCE: adapted from Hoffman and Novak (1996).

In Figure 1.2, Content Characteristics refer to the actual content of an online environment, such as the game interface of a game or the chat function of a SNS, and in the S-O-R model would refer to the Interactivity constructs of Active Control and Reciprocal Communication (Hoffman & Novak, 1996; Huang, 2012). Process Characteristics refer to the emotional and experiential responses made by an individual and would therefore refer to the Involvement constructs of Cognitive Involvement and Affective Involvement (Hoffman & Novak, 1996) described in the S-O-R model.

Control Characteristics are elements of Flow that can be controlled, either by an individual or the online environment they are engaged in (Hoffman & Novak, 1996). Control Characteristics include two constructs: *Skill* and *Challenge* (Hoffman & Novak, 1996; Hoffman & Novak, 2009; Mathwick & Rigdon, 2004). Skill can be defined as a consumer's capacity for action and Challenge can be defined as the opportunities for action available to the consumer in a CME (Hoffman & Novak, 1996).

Skill and Challenge have a congruent relationship and work in synchronicity to achieve a state of Flow (Hoffman & Novak, 1996; Mathwick & Rigdon, 2004). If Skill is greater than Challenge it can lead to boredom, whereas if Challenge is greater than Skill it can lead to anxiety (Mathwick & Rigdon, 2004). Therefore, for a player to achieve a state of flow in an online social game, the challenge offered by the game needs to match the level of skill of the player. If a player can satisfactorily overcome the challenges

presented by a game with their current level of skill, they are more likely to immerse themselves in the game (Hahl, 2014; Narinen, 2014). If players become bored or frustrated, they may instead choose to abandon the game (Mathwick & Rigdon, 2004).

Challenge is thus a crucial element in keeping gameplay interesting and enjoyable (Hahl, 2014). A player's level of skill improves over time and game challenges therefore, need to rise to meet it (Hahl, 2014), in order to ensure a state of flow is reached. Challenge creates goals for players to achieve and offering them at different levels of difficulty allows them to match evolving levels of skill (Brown, 2010). Goals and achievements thus offer greater immersion into a game (Hahl, 2014, Marchand & Hennig-Thurau, 2013) which can lead to heightened states of flow (Mathwick & Rigdon, 2004). Challenge and Skill are therefore useful constructs for use as environmental stimuli in an S-O-R model for Online Gaming as they influence the Flow experience in gaming.

1.2.4 The S-O-R Model for Online Gaming

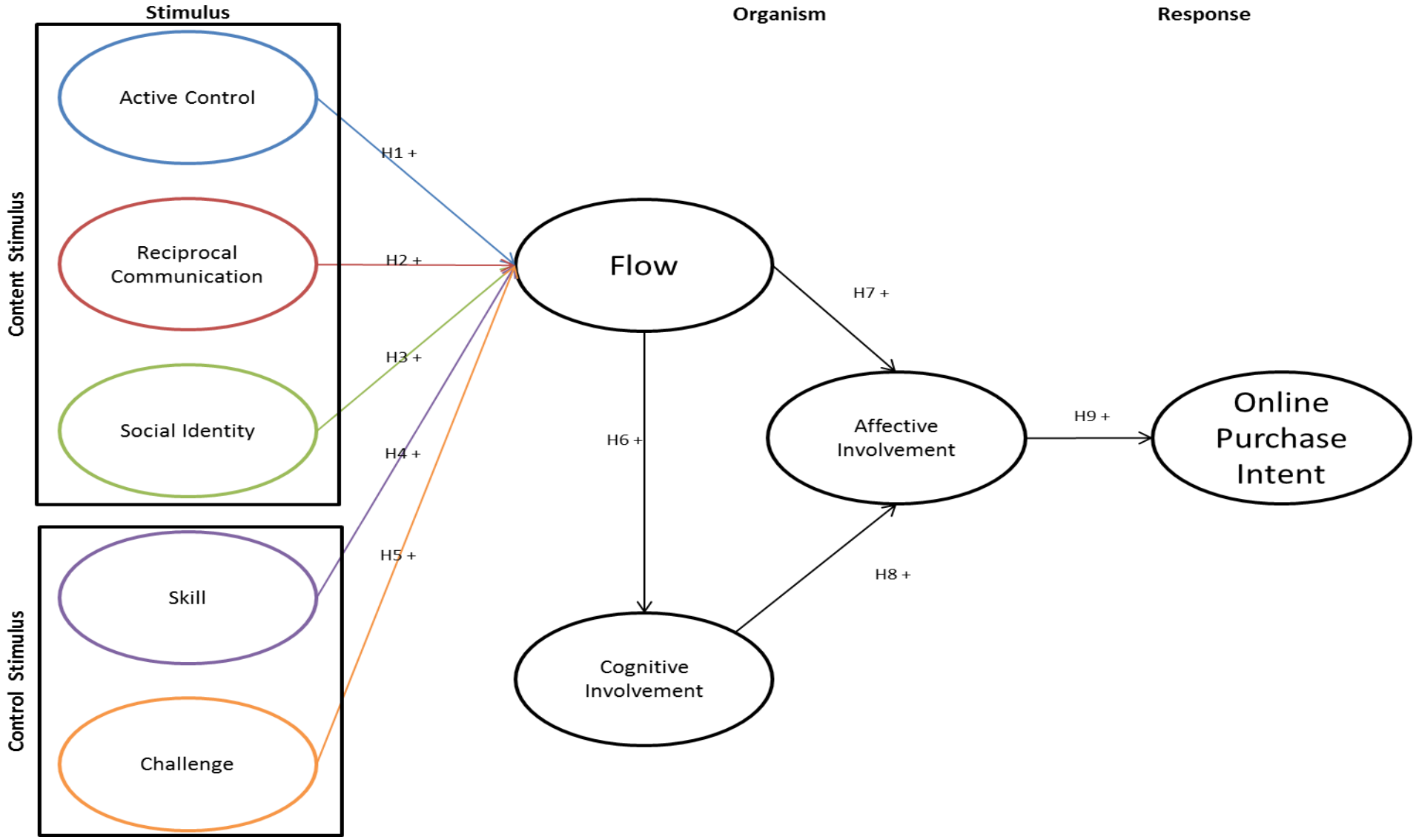
The preceding sections of this chapter detailed the S-O-R model for SNSs (Figure 1.1). By including the constructs Skill and Challenge, the S-O-R model was adapted for online gaming. The S-O-R model for Online Gaming is shown in Figure 1.2 below.

The S-O-R model for online gaming includes the Stimulus constructs *Active Control*, *Reciprocal Communication*, *Social Identity* and two additional constructs, *Skill* and *Challenge*. Greater Active Control and Reciprocal Communication triggers the flow experience (Novak *et al*., 2000), leading to heightened states of flow and positive influencing Flow. A positive Social Identity can lead to greater gameplay experience and immersion, positively influencing Flow. Higher levels of Skill, leads to greater game immersion (Hahl, 2014; Narinen, 2014) and positively influences Flow. Challenge involves creating goals and achievement that may lead to greater immersion in a game (Mathwick & Rigdon, 2004) and positively influences Flow. As Thus, all Stimulus constructs in the S-O-R model for online gaming have a positive influence on Flow.

The Organism constructs of the model include the constructs *Flow*, *Cognitive Involvement* and *Affective Involvement*. Flow leads to the development of positive emotions (Hoffman & Novak, 1996; Huang, 2003; Guo & Barnes, 2009) and is linked to greater learning, increase curiosity and positive experiences and memories (Hoffman & Novak, 2009). Thus, Flow has a positive influence on Cognitive Involvement and Affective Involvement. Greater Cognitive Involvement can also lead to greater Affective Involvement (Isen, 1993; Roseman & Smith, 2001; O'Regan, 2003). Thus, Cognitive Involvement has a positive influence on Affective Involvement and mediates the relationship between Flow and Affective Involvement.

Finally, Involvement has been shown to have a strong influence on purchase intention (Jiang *et al*., 2010; Huang, 2012) and Affective Involvement in particular is shown to have a greater influence on purchase intention (Huang, 2012). Thus Affective Involvement has a positive influence on the only Response construct, *Online Purchase Intention*.

FIGURE 1.3: THE S-O-R MODEL FOR ONLINE GAMING



SOURCE: Adapted from Huang (2012), Hoffman & Novak (1996, 2009

The relationships discussed above, led to a number of objectives which were investigated in the study:

- To determine the influence of Active Control on Flow.
- To determine the influence of Reciprocal Communication on Flow.
- To determine the influence of Social Identity on Flow.
- To determine the influence of Skill on Flow.
- To determine the influence of Challenge on Flow.
- To determine the influence of Flow on Cognitive Involvement.
- To determine the influence of Flow on Affective Involvement.
- To determine the influence of Cognitive Involvement on Affective Involvement.
- To determine the influence of Affective Involvement on Online Purchase Intention.

The following section describes briefly how this model was tested. The complete methodology is detailed in Chapter 4 and the results of the model testing was detailed in Chapter 5 of this study.

1.3 METHODOLOGY

This section details an overview of the methodology used in this study. This includes details of the research design and method, sampling design, measurement and scaling, and statistical analysis employed in this study.

1.3.1 Research Design and Method

This study attempts to describe the behaviour of consumers who play online games. The research design therefore deemed most appropriate for this study was a conclusive, descriptive research design as the intentions of this study were to describe the relationships between each of the constructs in the S-O-R model for online games (Malhotra, 2010). The design and method was also suitable for this study as it was appropriate for testing Structural Equation Models, which was used in this study (Wong, 2013). Studies that used a similar research design and method include Jang & Namkung (2009), Huang (2012), and Kim and Lennon (2013). Furthermore, the study made use of a cross sectional descriptive research design, as the data was collected only once from a single sample of respondents over a short period of time.

With regards to a research method, a descriptive research design requires the use of either Observation methods or Survey methods (Shiu, Hair, Bush & Ortinau, 2009). The online survey method was deemed most appropriate for this study for three reasons. Firstly, the administration of the questionnaire was simple (Malhotra, 2010). Secondly, the data obtained was reliable as the responses obtained were usually limited to fixed alternatives (Shiu *et al.*, 2009). Finally, the preparation, analysis and interpretation of the data gathered was relatively simple (Shiu *et al*., 2009). The online survey method was chosen for this study in particular as the method required high levels of control over the sample and the ability to collect large amounts of data in a

short amount of time (Tull & Hawkins, 1993). Online surveys were also used in Huang (2012) and Kim and Lennon (2013).

1.3.2 Target Population and Sampling Design

The sampling design comprises five steps: defining the target population, identifying a sampling frame, choosing a sampling technique(s), determining the sample size and executing the sampling design (Malhotra, 2010). The target population of this study were players of online games which have IAP functionality that adds to the competitive nature of gameplay. In order to reach this target population, the study made use of the UCT student and staff emailing lists, as well as the online social media platform, Facebook, specifically the profile of the researcher. Extant literature shows that most game players fall into the age of university students (18-30 years old) (Voiskounsky, Mitina & Avetisova, 2005; Cole & Griffiths, 2007; Yee, 2007) and the same age group also forms a large user base of Facebook (Huang, 2012; Chang, Hung, Cheng & Wu, 2015).

The sampling frame for this study included the list of staff and students on the UCT emailing list and the researchers Facebook friend list, both at the time of data collection. However, the sampling frames included elements that did not belong to the target population (Wyner, 2007) and a filter question was included to make sure that these respondents were not included in data analysis. This study therefore, made use of non-probability sampling techniques, specifically the non-probability convenience sampling technique (Malhotra, 2010).

The sample size chosen for this study was 200 respondents, as this is the minimum suggested sample size for problem solving research (Malhotra, 2010) and was also employed by similar previous studies (Mathwick & Rigdon, 2004; Huang, 2012).

1.3.3 Data Collection and Analysis

Data collection for this study began on March 10, 2016 when the link to the survey was first shared. The questionnaire was administered using the online survey platform Qualtrics, and the link to the Qualtrics survey was shared on the researchers Facebook page and through the UCT emailing system. The link was shared three times on Facebook and only once through the UCT emailing system. The link remained active for four weeks, at which point no further responses had been observed for a week prior. At this point, 263 responses had been obtained which was more than the required 200 minimum respondents. Thus, the researcher determined that no further responses were necessary and closed the survey link. The data was then cleaned and coded in preparation for statistical analysis.

The collected data for use in this study was analysed using two statistical programmes. The descriptive statistics were analysed using SPSS and the inferential statistics, using the Partial Least Squares Structural Equation Modelling (PLS-SEM) approach, were analysed using SmartPLS (Ringle, Wende & Becker, 2015).

This study made use of a PLS-SEM as opposed to Covariance-Based Structural Equation Modelling (CB-SEM) as it attempted to predict the online purchase behaviour of the players of online games with IAP functionality. Thus a PLS-SEM approach was suitable as it is predictor orientated as opposed to CB-SEM which is theory-oriented (Hubona, 2010). The study made use of a conceptual model with nine constructs and 33 indicators. Thus, PLS-SEM, which is variance based, allowed for the use of more than two constructs (Hubona, 2010). This study also made use of a sample of 212 observations. PLS-SEM was thus a preferred approach as it allowed for the use of smaller sample sizes (Wong, 2013). Lastly, the data used in the study did not follow a normal distribution. PLS-SEM was, thus, the more suitable approach as it did not require data to be normal, whereas CB-SEM does (Hubona, 2010).

The PLS-SEM approach requires the analysis of a measurement model and a structural model (Wong, 2013; Hair, Sarstedt, Hopkins & Kuppelwieser, 2014). The measurement model is used to assess the reliability and validity of the model, while the structural model is used to assess the model fit and the relationships between constructs in the model (Anderson & Gerbing, 1982; Savalei & Bentler, 2006). Once the measurement model and structural model have been analysed, the overall model and hypotheses can be evaluated using the path coefficient values and the t-values of the model (Wong, 2013; Hair *et al*., 2014).

The results of the statistical analysis were detailed in Chapter Five of this study.

1.4 CONTRIBUTIONS OF THE STUDY

This section details the contributions of this study to the field of marketing as well as the online gaming industry.

This study developed the S-O-R model for Online Gaming, and adaptation of the S-O-R model for Social Networking Sites (Huang, 2012). The S-O-R model for Online gaming thus adapted an existing model so that it may be applied in a new context. Furthermore, this study made use of a model developed for use in environmental psychology and often employed in the study of consumer behaviour (Jacoby, 2002), as well as focusing on a topic studied primarily in the fields of computer science and information technology. Thus, this study took an interdisciplinary approach and the findings are thus applicable to different fields of study. In particular, the study provides insight into the behaviour of players in online games. As the findings of this study found the model to be both reliable and valid, this provides the field of marketing and the online gaming industry with a sound theoretical model that be applied to the study of online gaming player behaviours and OPI.

The results of this study can also be used to assist marketers in better understanding the drivers of OPI in online gaming in order to better monetise games. In this way, game creators and marketers can better understand how to create and market online social games so that IAPs are maximised. Furthermore, as the S-O-R model is used

in the study of consumer behaviour, the results of the study can be used to assess the behaviour of players in online games. This is applicable particularly with regards to how players behave when they interact with other players, how they interact with the game and their purchase intentions for IAPs in a game.

Research into online gaming, particularly with regards to the monetisation of online games, is limited and many sources of extant literature are quite recent (in comparison to the time of this study) (Debeauvais *et al*., 2012; Feijoo Gomez-Barroso, Aguado & Ramos, 2012; Hahl, 2014; Lee, 2013; Alha *et al.*, 2014; Narinen, 2014; Vankka, 2014). Furthermore, research into the online gaming industry in South Africa is very limited and the industry remains relatively unexplored in a South African context. Thus, this study also aimed to provide additional literature with regards to the online gaming industry and OPI for virtual goods in the South African context.

The following section of this chapter details the outline of the chapters to follow.

1.5 DEMARCATION OF THE STUDY

The research problem for this study was developed through an analysis of the online gaming industry, while the conceptual model used in this study (Figure 1.2) was adapted from the S-O-R model. The theoretical framework, methodology and statistical analysis of this study was developed over six chapters. The chapter's demarcation can be seen in the table below:

TABLE 1.1: OUTLINE OF THE STUDY CHAPTERS

Chapter 1	**Introduction**
	Theoretical Framework, Research Questions, Hypotheses
Chapter 2	**The Online Gaming Industry**
	Industry, Gaming Business Models, Monetisation of Games
Chapter 3	**The S-O-R Model**
	S-O-R model for Social Media, S-O-R model for Online Gaming
Chapter 4	**Methodology**
	Research Design and Method, Sampling, Statistical Analysis
Chapter 5	**Results**
	Descriptive Statistics, Inferential Statistics, Hypotheses
Chapter 6	**Conclusions and Recommendations**
	Conclusions, Managerial Implications, Limitations, Future Research

The study begins with the Introduction which serves to introduce the research problem presented in this study in addition to laying the foundations for the chapters to follow. Chapter Two discussed the Online Gaming Industry specifically in relation to the gaming business models employed by companies in the industry. The latter half of Chapter Two focuses on the Free-to-Play (F2P) gaming business model and the various methods of monetisation which can be used in this model.

Chapter Three of this study, introduced the Stimulus-Organism-Response (S-O-R) model specifically as it was adapted by Huang (2012) in a study on Online Social Media. The chapter then details the conceptual model used in this study, the S-O-R model for Online Gaming (Figure 1.2), and how it was adapted from previous studies (Hoffman & Novak, 2009; Huang, 2012).

Chapter Four of this study detailed the research methodology employed. The chapter discussed the research design and method, the sampling design, the measurement instrument, and the statistical analysis methods used. As the study made use of a conceptual model, Structural Equation Modelling approaches were discussed. The study specifically made use of the PLS-SEM approach, and the justification for this using this approach was also detailed.

Chapter Five detailed the results of the statistical analysis outlined in Chapter Four, starting with descriptive statistics and followed by inferential statistics. With regards to the inferential statistics, the chapter first detailed the measurement model of SEM followed by the structural model of SEM, and finally, detailing the overall model and hypotheses tested. The final chapter of this study, Chapter Six, discussed the implications of the results detailed in Chapter Five. Conclusions were drawn from the statistical analysis and used to make managerial implications. The limitations of the study and areas of possible future research were also discussed.

1.6 CONCLUSION

This chapter served as a foundation for this study and introduces the chapters to follow. The chapter details the background theory underlying this study and used to build the theoretical framework of this study. The extant literature examined was used to build a conceptual model for use in this study, the S-O-R model for Online Gaming. Following the background literature, the research questions guiding this study and hypotheses proposed are detailed. Thereafter an outline of the methodology employed in this study was provided followed by the contributions of this study. Finally, the chapter provides the demarcation of the rest of this study. This chapter provides an overview of the discussion provided in the Chapters outlined in the Demarcation of the study. Following this chapter is thus a detailed review of the literature in Chapters Two and Three, the complete methodology used in this study in Chapter Four, the results of the statistical analysis of this study in Chapter Five, and finally, the discussion of results and managerial implications in Chapter Six.

CHAPTER TWO: THE ONLINE GAMING INDUSTRY

2.1 INTRODUCTION

The purpose of this study was to investigate the relationships between the characteristics of online games, the gameplay experiences of players and the online purchase intention of players with regards to In-App Purchases (IAPs). To this end, the study explores the use of the Stimulus-Organism-Response (S-O-R) model and how it may be applied to online gaming. Furthermore, it seeks to identify and explore the factors that may influence the Online Purchase Intent of In-App Purchases for players in online games. The study aims to contribute to the field of online consumer behaviour, especially with regards to the influencers of online purchase intent when purchasing virtual goods. This chapter aims to lay the foundation for the research by exploring the online gaming industry, the business models used in online games and the monetisation of online games.

In order to understand the current business models for online gaming, it was necessary to explore the online gaming industry and the advancements made therein, that have shaped the industry as it is today. Furthermore, in order to understand how OPI can be influenced in online games, it was crucial that the monetisation mechanics of online games were explored.

The gaming industry has its roots in video gaming and was first developed for play on personal computers and arcade gaming machines. Over time the development of gaming consoles furthered the commercialisation of games and made them more readily available to the general public (Smith, 2014). The growth of the internet led to the development of the first online game and the eventually, the very successful Massively Multiplayer Online (MMO) gaming phenomenon (Vankka, 2014). The development of mobile gaming and free online software providers like Google, have resulted in even greater growth in the online gaming industry (Feijoo *et al.*, 2012).

The many advancements in the industry have led to the development and adaptation of gaming business models in order to maximise the monetisation of games. These online gaming business models include the retailing, subscription gaming and free-to-play gaming models.

The monetisation of games is crucial aspect of a gaming business model and is especially important for free-to-play games as these games have limited sources of income. In order to understand monetisation in online games the drivers of online purchase intent have been explored by game developers and researchers, and has resulted in the development of a number of conceptual models for the determination of OPI.

In this chapter, the literature first explores the online gaming industry and the specific business models used in the industry. The chapter then expands on traditional gaming models as well as the newer Free-to-Play (F2P) model of gaming. Lastly, the chapter

analyses the monetisation of F2P games and the conceptual models which can be used to explain the reasons for monetisation in online games.

2.2 THE ONLINE GAMING INDUSTRY

The world of online gaming is a large, rapidly growing industry that has become highly profitable. The video gaming industry is currently one of the most successful and profitable markets in entertainment. In 2012, the total value of the gaming industry was $78.87 billion (Hahl, 2014). In 2016, the industry was estimated to have 168.8m players worldwide and made an estimated US$11, 594m in revenue (Statista, 2016). The growth of the industry is exponential and future projections only see it continuing to grow (Lee, 2013) with projections for 2021 estimating player growth up to 172.8m players and revenue growth up to US$13,506m (Statista, 2016). The gaming industry is also a rapidly evolving one, with games becoming far better and more realistic overtime (Lee, 2013; Hahl, 2014; Narinen, 2014).

The origin of video gaming began with the invention of the computer from as early as the 1950's (Bateman, 2014). These games were created to demonstrate new advancements in computers and were therefore academic in nature (Smith, 2014). One of the first non-academic games, Spacewar, was released in 1962 and marked the beginning of commercialized selling of video games (Graetz, 1981). This introduced games as a form of entertainment and enjoyment for the general public.

Games were initially developed for personal computers and arcade gaming machines. While gaming arcades quickly became popular, games made for computers faced slow growth due to the high cost of purchasing a PC. The success of video games but the expense of PC led to the development of portable gaming consoles.

The first commercialized console, the Magnavox Odyssey, was invented in 1972 specifically for home use (Poh, n.d.). The success of a portable gaming console spurred other electronics manufacturers to attempt similar devices. 1978 saw the entrance of current gaming giant, Nintendo, while 1994 saw the introduction of Sony's first Playstation console. The Sony Playstation series has been the dominant console ever since and, along with Microsoft's Xbox and Nintendo's Wii, are the biggest players in the gaming console industry (Tenant, 2017).

Unfortunately, the cost of gaming was rather high, as games and gaming devices had to be purchased separately. Furthermore, games were static and players could quickly grow bored of a game once it was completed. Indeed, the single most important aspect of gaming for players is enjoyment (Sweetser & Wyeth, 2005) and if players do not enjoy the game they do not play it (Lee, 2009).

A solution to the issue of static games was the use of the internet. Games placed on the internet could be updated regularly to keep players interested. The gaming industry has experienced massive growth in recent years and, with the simultaneous growth of the internet, has begun to move into an online sphere (Lee, 2013; Hahl, 2014).

However, the internet as a solution only became viable in the 1990s when the National Science Foundation Network (NSFNET) began to relax restrictions to the use of the internet (Harris & Gerich, 1996).

Efforts to expand gaming to the internet gave rise to the phenomenon of MMO gaming. MMO games require an online connection to play and can thus be played anywhere in the world, granted there is appropriate hardware and an internet connection. The first true MMO games were played on restricted servers and were very expensive (Vankka, 2014). In 1985, the online service provider CompuServe provided access to the game *Island of Kesmai* at a cost of $12 per hour and could only support 100 players at a time (Koster, 2002).

With restrictions on commercial use of the internet relaxed by NSFNET, game developers like Sierra and Sony Online Entertainment began the development of games specifically for online play (Lombardi, 1992). This gave rise to a popular form of MMO gaming, involving role playing and virtual world exploration, known as Massively Multiplayer Online Role-Playing Games (MMORPG). MMORPGs are computer role-playing games played in a virtual world that exists independently from the players (Billieux, Van der Linden, Achab, Khazaal, Paraskevopoulos, Zullino & Thorens, 2013). The most popular and most successful MMORPG to date is World of Warcraft and was launched in November 2004 by Blizzard Entertainment (Taylor, 2006). In 2012, it was estimated that there were 20 million players of MMORPGs worldwide with at half accounting for World of Warcraft players (MMOdata.net, 2012). Additional examples of MMOs include League of Legends, Guild Wars and Star Wars: The Old Republic.

Previous studies show that most MMO players are between the ages of 18 – 30 (Voikunsky *et al*., 2005; Cole & Griffiths, 2007; Yee, 2007) with an average of 80% of players identifying as male (Griffiths, Davies & Chappell, 2004; Cole & Griffiths, 2007). The average play time per week is estimated to be 23 hours (Cole & Griffiths, 2007; Yee, 2007) but is also shown to differ dependant on the player's country of residence (Krotoski, 2004; Cole & Griffiths, 2007).

Many games are now created to be played either in conjunction with or solely in an online environment. These online environments are often referred to as Computer-Mediated Environments (CMEs) and can thought of as being alternate realities created through computer interfaces such as web pages, SNSs and online games (Hoffman & Novak, 1998; Siddiqui & Turley, 2006). Given the interconnected nature of the internet, CMEs are often connected to each other. For example, many online games can be played through the SNS, Facebook, and online games in turn allow in-game achievements to be posted to Facebook as status updates (Lee, 2013).

The rapid advancement of technology has also given rise to smartphones and tablets, both of which are now capable of supporting gameplay that can rival those played on a gaming console or PC (Feijoo *et al.*, 2012). The introduction of mobile gaming has

fuelled the growth of online games since many online games can now also be played on mobile devices (Soh & Tan, 2008; Kuusisto, 2014). The success of mobile games has made mobile devices highly competitive against gaming consoles and is estimated to soon overtake console and computer gaming (Soh & Tan, 2008). In an effort to remain competitive, many PC and console games offer mobile gaming companions often linking the games through online connections such that achievements on one gaming device transfer to another (Lee, 2013).

The interconnectedness aspects of online gaming also gave rise to complexities in the way games are monetised. In the past, games could only be purchased at retail stores but the progression of online business, and innovation within the gaming industry, has led to massive online software stores such as the Google Play store or the Apple iStore. The advancement of gaming and electronic payment software technology has also led to the formation of various gaming business models. These include retailing, subscription gaming and free-to-play gaming (Feijoo *et al*., 2012). Each of these gaming business models will be explained further in detail in the section to follow.

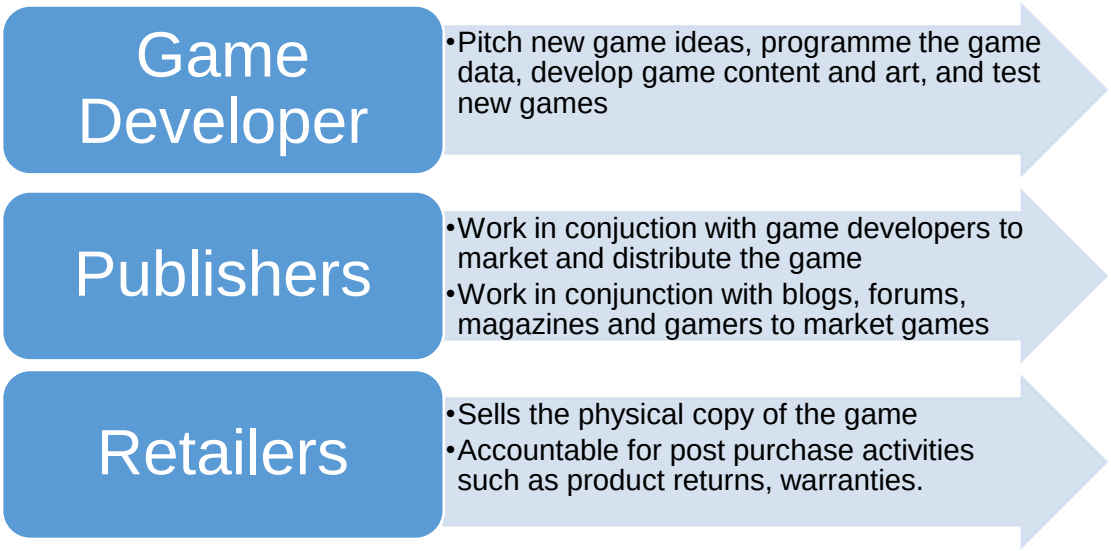
2.3 ONLINE GAMING BUSINESS MODELS

Business models for gaming have significantly advanced as the gaming industry has continued to grow. In the past, games were sold in single units and were only available for sale at selected retail outlets. This 'traditional' business model for online gaming was known as the Retail Gaming Business Model (Feijoo *et al*., 2012). The retailing model for gaming involved a once-off purchase of a game without any real interaction with the developers of the game. Post purchase services such as product returns were dealt with by retailers. Game developers had little contact with game players after the creation of a game and as mentioned previously, games were static and could quickly lead to boredom.

The retailing model itself is a set of integrated processes with the goal of producing and selling a game to consumers. A simplified model of the players involved in the process and the roles they play can be observed in the Figure 2.1.

In the retailing model, games are developed by game developers. Game developers may form part of independent game development companies (such as Blizzard Entertainment) or may be a department in established software companies (such as Microsoft Game Studios – a division of software giant, Microsoft). Game developers pitch new game ideas and engineer games from start to finish with the assistance of programmers and computer graphic artists (Tkach, 2007).

FIGURE 2.1: THE RETAIL GAMING BUSINESS MODEL



SOURCE: Adapted from Tkach (2007)

Once a game is completed, developers partner with publishers to market and distribute games to retailers and consumers. Publishers also work with third parties such as bloggers, gaming magazines and reputable gamers in order to market new games. The games and select marketing materials are then sold to retailers who also take on the responsibilities of post purchase activities (Tkach, 2007; Vankka, 2014).

Following the game purchase, the consumer would have no further business interactions with the game makers. This meant that consumers of games (or the players of games) and game makers had little real interaction, and communication (in the form of marketing efforts or customer feedback) was very limited. In terms of game monetisation, games were a once-off purchase and revenue streams were therefore limited to how many units of games could be sold.

The challenge for the gaming industry was to create continued revenue streams in order to make gaming a more profitable business. The growth of the internet presented a possible solution, in the form of online games. The development of online gaming, and MMO gaming in particular, led to the development of two new business models for gaming: the subscription model and the free-to-play model.

2.3.1 The Subscription Model for Online Gaming

The development of online gaming, and MMO gaming in particular, led to the need for expansive computer servers in order to contain the gaming CME and support a large number of game players. The maintenance of servers however is, even now, a very expensive endeavour (Lee, 2013). The retailing gaming business model of a once-off purchase would not suffice if online games were to be profitable. As such, game developers established a new gaming business model that would ensure a continued

revenue stream. This business model of gaming has come to be known as pay-to-play (P2P) gaming and took the form of subscription fees (Kuusisto, 2014).

The subscription model of gaming requires players to pay subscription fees for access to an online game. Subscription fees are recurring payments, often paid at the beginning of the month (Lee, 2013). Games that are more popular and have larger player bases may have longer subscription periods such as quarterly or bi-annual subscription payments.

Some MMO games, like World of Warcraft, sell the gaming software in retail stores and provide access to the game for a set time period or up to a certain point in gameplay. Further access to the game would then requires the player to subscribe to the game and pay the recurring subscription payments (Lee, 2013).

This model of gaming is often expensive, in terms of subscription and data costs, to consumers but is still one of the most successful and ever-growing gaming models (Debeauvais *et al.*, 2012). This is due to its ability to generate revenue continuously as well as attract players that are willing to pay costly subscription fees (Billieaux *et al.*, 2013; Lee, 2013). The MMO industry, however, grew increasingly competitive over time and many smaller MMO games began to offer free gameplay with certain in-game actions and activities requiring purchases of very small amounts (Lee, 2013). This business model for online gaming, offering free games with small in-game purchases, has come to be known as the free-to-play model of gaming.

2.3.2 The Free-to-Play Model for Online Gaming

Advancements in online payment methods and the ability to integrate these payment methods into CMEs led to the development of newer models of gaming which are more sustainable over longer periods of time (Debeauvais *et al*., 2012; Hahl, 2014). MMO gaming in particular has formed the base for many recent gaming business models and was instrumental in the development of in-game purchases (Hahl, 2014; Kuusisto, 2014). These purchases were often for smaller amounts and were known as *Micro-transactions*. Microtransactions are paid for with real world currency, or ‘hard currency’, as opposed to an in-game currency, or ‘soft currency’ (Hahl, 2014). MMO gaming and the development of micro-transaction capabilities led to the development of one of the most successful business models of gaming to date, the Free-to-Play (F2P) model (Alha *et al*., 2014; Kuusisto, 2014; Narinen, 2014, Xicota, 2013).

Free-to-Play or F2P gaming, which is popular in the online gaming environment, involves offering the game software, known as the ‘gaming client’, for free and then offering a number of micro-transactions called In-app Purchases (IAPs) to players throughout the course of gameplay (Kuusisto, 2014). The IAPs are always optional and a player is free to continue play without spending hard currency. However, IAPs are often made to allow significantly improved gameplay and, subsequently, a better gaming experience (Hahl, 2014). Therefore, players are often encourage to make IAPs during the course of gameplay (Hahl, 2014).

There are also two additional F2P gaming models and each deviates slightly from the model described above. The 'Freemium' model of gaming offers the gaming client for free and then offers a number of IAPs. However, IAPs are far more crucial to gameplay in a freemium game and a player's willingness to make IAPs may influence whether a freemium game is played or not (Alha *et al*., 2014). The 'Paymium' model of gaming charges for the gaming client and also offers a number of IAPs, however, these IAPs often have little impact on gameplay (Hahl, 2014).

In order to classify where a game falls on the spectrum of F2P, there are five proposed categories of payment in relation to gameplay, as shown in Table 2.1 below.

TABLE 2.1: THE SPECTRUM OF F2PGAMING CATEGORIES

Category	Description	Source
True Pay to Win	IAPs directly influence gameplay. IAPs cannot be obtained through regular gameplay. Paying players have a significant advantage over non-paying players.	Hahl (2014), Kuusisto (2014)
Hard Pay to Win	IAPs significantly advance gameplay in a short space of time. IAPs can be obtained through regular gameplay but at a far slower pace. Paying players have a significant advantage over non-paying players.	Hahl (2014), Kuusisto (2014), Narinen (2014)
Soft Pay to Win	IAPs only give small competitive advantages. Little difference between being a paying player and non-paying player.	Hahl (2014)
Free to Play	IAPs do not offer competitive advantage. IAPs are vanity or convenience purchases only (e.g. Character clothing or additional storage space for game items).	Hahl (2014), Oh & Ryu (2007), Vankka (2014)
True Free to Play	IAPs do not offer competitive advantage. IAPs are vanity purchases only (e.g. Character clothing).	Hahl (2014), Oh & Ryu (2007), Vankka (2014)

The first and last categories are the extremes of the spectrum and categories are arranged according to the competitive advantage IAPs give a player. *Freemium* games often fall into the first three categories, *Paymium* games often fall into categories two and three, and F2P games mostly fall into the last two categories (Hahl, 2014). Some games, such as World of Warcraft, use a mix of gaming business models (subscription and F2P, in this case) and therefore fall into multiple categories.

This study focuses on the F2P gaming business model as addressing the research questions (detailed in Chapter 1) requires the use of games with IAP functionality. The Retailing model of gaming involves the sale of games in retail stores (Feijoo *et al*.,

2012), and thus focuses on Purchase Intent as opposed to Online Purchase Intent. Furthermore, consumers only purchase the game once and do not make any IAPs. Games using the Retailing model were thus not a suitable for use in addressing the research questions of this study.

The Subscription model of gaming requires players to pay subscription fees for access to an online game, and thus, games which strictly employ this model do not include any IAPs during the course of gameplay (Lee, 2013). Games using the Subscription model of gaming were thus also not suitable for use in this study. As such, with the exclusion of the Retailing and Subscription model, the F2P model of gaming, which includes IAP functionality, was most suitable for use in this study. Examples of applicable games include, but are not limited to, include: World of Warcraft, Star Wars: The Old Republic, The Elder Scrolls: Online, Wakfu and Tera: Fate of Arun.

The F2P gaming model is highly successful in its ability to draw in new players and has proven to be particularly successful in the mobile gaming market (Soh & Tan, 2008). By offering the gaming client for free, consumers are more willing to download a new game and try it out (Ahla *et al*., 2014). The challenge for F2P games is in retaining players and then getting them to make IAPs. The success of F2P gaming relies largely on income from IAPs as this is often the only source of income for these games. As such, there is extensive focus on income generation or 'monetisation' in F2P games. The monetisation of F2P games is discussed in the following section.

2.4 MONETISATION OF F2P GAMES

F2P games have limited sources of income namely, IAPs, subscription fees and in-game advertisements. IAPs are often the largest income stream for online games and many online games offer regular prompts for IAPs throughout the course of gameplay (Alha *et al*., 2014). IAPs are however, shown to be only purchased by a small percentage (approximately 3-5%) of the player population in any online social game (Fields & Cotton, 2012). In addition, only a small percentage of paying players make supernormal levels of IAPs while the majority make small, regular IAPs (Vankka, 2014). Approximately 50% of paying players in a game make only small IAPs, accounting for 11% of revenue while only 10% of paying players make supernormal IAPs, accounting for 44% of revenue (Lovell, 2011; Narinen, 2014) Therefore, understanding how to effectively monetise the player base is crucial to the success of any game.

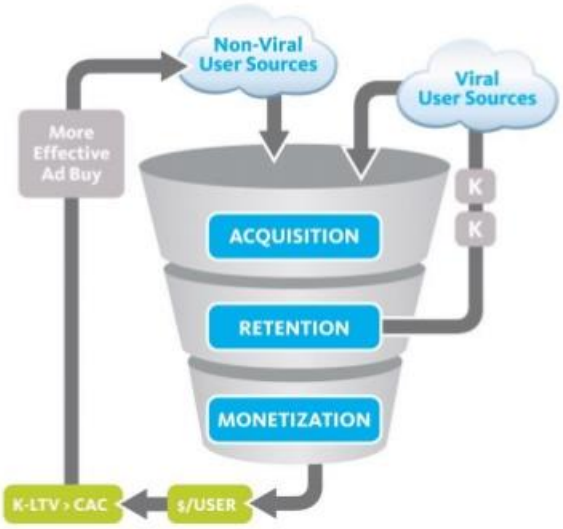
The willingness to purchase an IAP or the online purchase intent (OPI) is thought to be influenced by a number of factors. Some of the major influencers are thought to be game features (Hahl, 2014; Narinen, 2014; Vankka, 2014), player experience (Mathwick & Rigdon, 2004; Hoffman & Novak, 2009; Marchand & Hennig-Thurau, 2013); social influence (Cole & Griffiths, 2007; Huang, 2012) and player loyalty (Narinen, 2014). Many of these influencers are also thought to be linked and therefore may work together to affect OPI (Lovell, 2013; Narinen, 2014). For example, a game

with attractive gaming features and an enjoyable player experience is thought to increase player loyalty which in turn influences OPI. Research into the drivers of OPI has led to the development of a number of conceptual models assessing the relationships between the influencers and OPI (Hamari & Lehdonvirta, 2010; Hoffman & Novak, 1996; Huang, 2012; Lee, 2013; Narinen, 2014).

One such model, The ARM model, can easily be applied to the above example. The ARM model or 'Acquisition-Retention-Monetisation" model proposes that a player is first attracted to a game by its features (Acquired), is willing to continue playing because of an enjoyable gaming experience (Retention), and is then more likely to make IAPs (Monetisation) (Hamari & Lehdonvirta, 2010; Lee, 2013; Narinen, 2014). The ARM model follows a funnel design as it proposes that, within each stage, the number of players will decrease (Lovell, 2013). The model is not strictly limited to gaming, but is one of the most popular business models used by game developers (Narinen, 2014). An adaptation of the ARM model can be seen in Figure 2.2 below.

The first stage of the ARM model, Acquisition, involves attracting consumers to play the game (Narinen, 2014). In the initial stages of the game, acquisition activities mainly include marketing and promoting a game (Narinen, 2014). New games are often promoted on other CMEs such as social media platforms. In the highly competitive gaming market, newer games sometimes make use of celebrity endorsement and traditional media for promotion. An example of this is the mobile game Clash of Clans, which made use of celebrity model, Kate Upton, for Facebook advertisements and movie star, Liam Neeson, for a Superbowl commercial. Once a game is more established, acquisition efforts mainly involve (electronic) word of mouth amongst players (Kuusisto, 2014). In Figure 2, promotion efforts and word of mouth account for Non-viral User Sources of acquisition.

FIGURE 2.2: THE ACQUISITION-RETENTION-MONETISATION MODEL



SOURCE: Adapted from Kuusisto (2014).

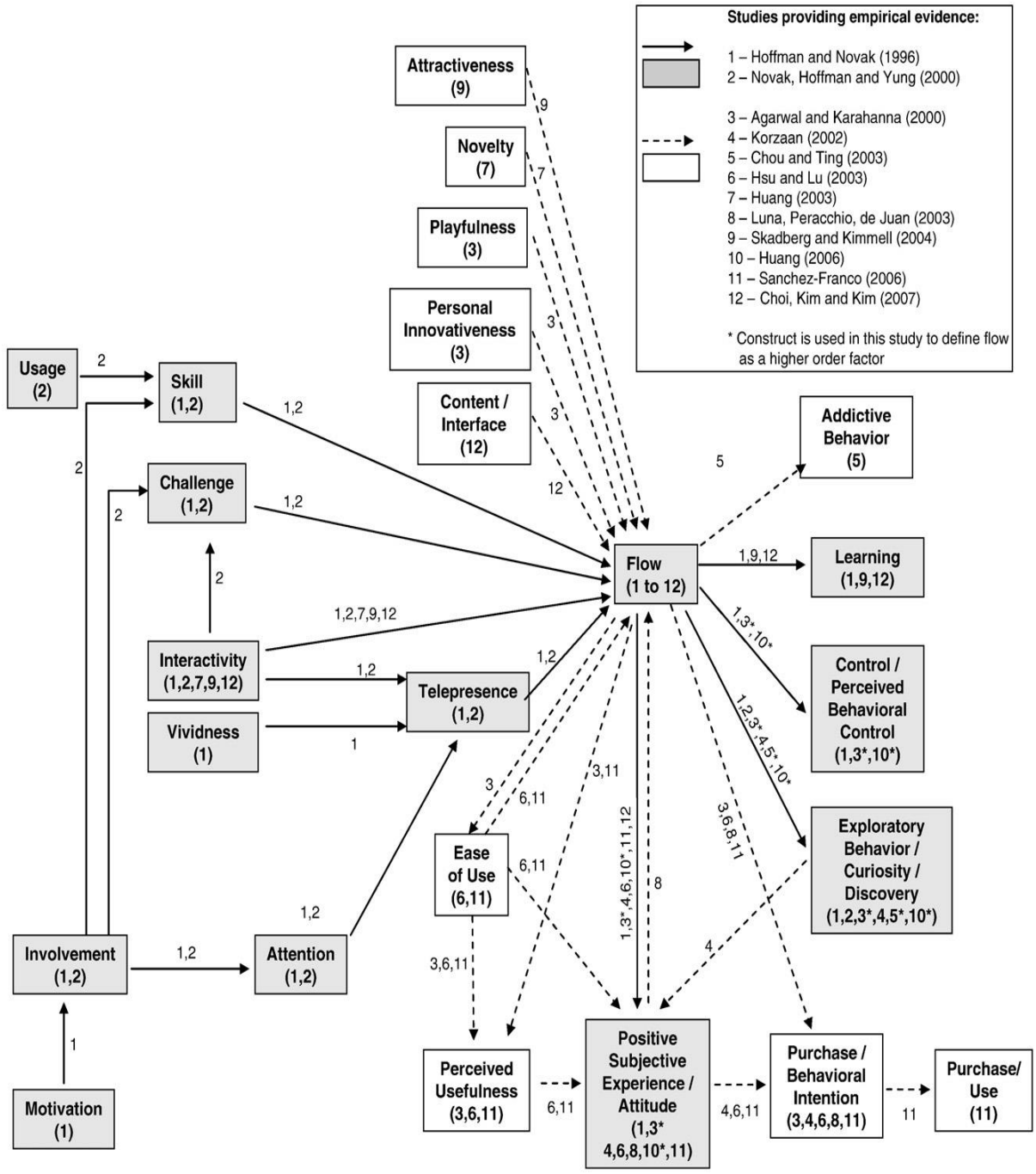
The second stage of the ARM model is Retention and involves keeping players interested in your game. According to Narinen (2014), player retention is one of the most important aspects for online games. The retention ability of a games is determined by the in-game mechanics that increase the stickiness of the game (Kuusisto, 2014). Stickiness, in terms of computing and website metrics, is defined as anything about a website that encourages a visitor to stay longer (Lin, 2007). Some of the in-game mechanics that keep players engaged with a game include daily play rewards, level gaining, competitive play with other players, engaging narratives and story progression (Hahl, 2014; Kuusisto, 2014; Narinen, 2014; Vankka, 2014). In Figure 2, retention efforts account for the Viral User Sources of the model.

The final stage of the ARM model is monetisation and involves selling IAPs to players during the course of gameplay. Only a small percentage of players elect to make IAPs (Fields & Cotton, 2012) and the ARM model represents this in the funnel design, since the number of player at each stage declines further (Lovell, 2013). In the ARM model, a game is successfully monetised when a player's Life Time Value (LTV) is greater than the costs associated with playing the game (CAC) (Kuusisto, 2014). The model theorises that once a player is in the monetisation stage, they will be more susceptible to making future IAPs and will engage in word of mouth advertising (Kuusisto, 2014; Narinen, 2014).

The simplistic in design of the ARM model, has a number of flaws. Firstly, the model only recognises all monetised players and does not take into account the different levels of purchases made by different players. Therefore, it fails to address how to get players to spend more on a game. Secondly, the model only focuses on in-game mechanics and ignores other drivers of OPI such as social influence (Huang, 2012). Therefore, it ignores non-game influencers and cannot accurately determine the effectiveness of word of mouth advertising by players. Finally, the model does not take into account which in-game mechanics are most effective at retaining players and influencing monetisation.

A more complex model, the Network Navigation in Hypermedia CME Model also called the Flow Model, first proposed by Hoffman and Novak (1996), uses the concept of Flow to explain the processes involved in an online experience. Flow, which is described as being an intrinsically motivated optimal state of mind (Csikszentmihalyi, 1975; Csikszentmihalyi, 1990), is thought to be an engrossing, highly enjoyable experience that leads to the development of positive emotions (Hoffman & Novak, 1996; Huang, 2003; Guo & Barnes, 2009). The model has since been improved and adapted (Hoffman & Novak, 1996; Novak, Hoffman & Yung, 2000; Hoffman & Novak, 2009), and can now be applied to SNSs or online gaming. The most recent adaptation of the model can be seen in Figure 2.3 below:

FIGURE 2.3: THE NETWORK NAVIGATION IN HYPERMEDIA CME MODEL



SOURCE: Hoffman and Novak (2009)

The model looks at a number of antecedents of Flow such as how involved a consumer is, how they choose to interact and control their online environment and how these antecedents in turn influence the construct of Flow itself (Hoffman & Novak, 1996). The model also looks at how flow in turn can influence consumer's ability to learn, the level of enjoyment experienced and their willingness to make purchases online (Hoffman & Novak, 2009).

The model and the concept of flow, is therefore quite useful in relating gameplay experiences to OPI. For online gaming, the model is more adept at analysing the influencers of OPI and can also be used to determine the relationships between the OPI and its influencers in games. Furthermore, the model takes into account both in-game mechanics, such as player skill and game challenges, as well as non-game influencers, such as player motivation and player interactions (Hoffman & Novak, 2012). As such the Network Navigation in Hypermedia CME Model may be more suited to determining the best way to monetise online games when compared to the ARM model.

As seen in Figure 2.3, the model accounts for 16 constructs which may affect Flow as well as another 8 constructs which may in turn be effected by Flow. Each of the constructs effected by Flow may in turn be affected differently by the antecedents of Flow. For example, Learning, which is influenced by Flow in the model, is more likely to be influenced by the antecedents Skill, Challenge and Ease of Use than any other antecedent in the model (Garris, Ahlers and Driskell, 2002). Similarly, OPI in online games, which is focused on in this study, may be greater influenced by only certain factors in the model such Skill, Challenge (Mathwick & Rigdon, 2004, Hahl, 2014) and Interactivity (Cole & Griffiths, 2007; Huang, 2012). Thus, the model contains constructs which may not be as relevant to the measurement of OPI in online games. Indeed, the Network Navigation in Hypermedia CME Model was developed for, and is therefore better suited to, the analysis of the construct Flow itself (Hoffman & Novak, 2009). As such, the Network Navigation in Hypermedia CME Model may not be the model best suited for measuring the OPI of IAPs in online gaming. Therefore, this study makes use of another model, the Stimulus-Organism-Response (S-O-R) model, which is less complex and can be more easily be applied to the study of OPI.

The S-O-R model is an environmental psychology model that is used to analyse the mediating effect of emotional responses on the relationship between the environment and an individual's behaviour (Mehrabian & Russel, 1980s). The model often used in consumer behaviour studies as it is a useful framework to analyse the mediating effects of emotional responses on the relationship between consumer-targeted stimuli and consumer's subsequent behaviour (Jacoby, 2002). This study developed a conceptual model based on the S-O-R model as it was adapted by Huang (2012) in a study to examine the effects of interactive and social features on users' online experiences and their purchase intention of virtual goods from a SNS, namely Facebook. By combining elements of the S-O-R model for SNSs (Huang, 2012) and the Flow Model (Hoffman & Novak, 2009), this study developed a conceptual model, the S-O-R model for Online Gaming, for use in answering the research questions proposed. The S-O-R model, the S-O-R model for SNSs, and the S-O-R model for Online Gaming are discussed in detail in the next chapter.

2.5 CONCLUSION

This chapter explored the online gaming industry and the business models used to monetise online games. The gaming industry has experienced rapid growth since its commercialisation in the 1960s. Since then, the gaming industry has expanded online and established the phenomenon of F2P gaming. The F2P has proven to be very popular amongst game players due to being offered for free and with no obligations to pay for play. F2P games do however, experience issues with the monetisation of games and only a small percentage of players eventually make an IAP. In order to maximize game monetisation, research has led to the study of the influencers of online purchase intent in CMEs. The study of the influencers of OPI has led to the development of the ARM model of game monetisation. The ARM model however, is too simplistic to fully analyse the influencers of OPI.

The Network Navigation in Hypermedia CME Model is used to analyse the antecedents of Flow, and has been adapted over time to be applicable to social media and online games. The model therefore provides a more suitable conceptual model for analysing OPI in online games. The model, however is better applied to the study of Flow itself. This study therefore presents a third conceptual model, the S-O-R model, in order to analyse the influencers of OPI. In the next chapter, the literature explores the S-O-R model, its adaptation to online social media, and how the model was used to develop a conceptual model for use in this study, the S-O-R model for Online Gaming. In addition, the following chapter will also explore the antecedents of the S-O-R model and the relationships between them.

CHAPTER THREE: THE S-O-R MODEL FOR ONLINE GAMING

3.1 INTRODUCTION

The monetisation of online games is crucial to the survival of the gaming industry since the majority of income is generated by In-App Purchases (IAPs) (Lovell, 2011; Narinen, 2014). The study of how to monetise an online game and the factors that influence monetisation, and thus Online Purchase Intent (OPI), is necessary for game developers and publishers. The models for monetisation was discussed in chapter 2: the Acquisition-Retention-Monetisation (ARM) model (Lovell, 2013) and the Flow model (Hoffman & Novak, 2009). It was found that while both were able to analyse purchase intention, each presented a number of limitations. As such a third model for the analysis of OPI in online games is presented in this chapter: The Stimulus-Organism-Response or S-O-R model. This chapter focuses on the S-O-R model and how it has been adapted for online gaming for this study.

In this chapter, the literature details the S-O-R model with a particular focus on the S-O-R model for Social Networking Sites (SNSs) as it forms the basis for the conceptual model used in this study, the S-O-R model for Online Gaming. SNSs are a form of Computer Mediated Environments (CME) and thus the model is suitable for adaptation to another CME, online games (Hoffman & Novak, 1998). This chapter discusses the three stages of the S-O-R model for SNSs, namely Stimulus, Organism and Response. The constructs for each stage are discussed in chronological order starting with the constructs for Stimulus, followed by those for Organism and finally, Response. The chapter also discusses how each of these constructs are linked within the context of the model, and how this model is applied in order to answer the research question stated in chapter one.

The following structure is consequently used for this chapter: First, the S-O-R Model is introduced and discussed, thereafter two additional Stimulus constructs (emanating from the theoretical discussion in Chapter Two) are introduced to the model: Skill and Challenge. Finally, the chapter discusses the S-O-R model in the context of online gaming. The chapter outlines the theoretical justification for using the S-O-R model to analyse purchase intention in online games and why the model proves most useful for this study. Finally, after providing the final model that was used, the hypotheses tested in this study are provided.

3.2 THE STIMULUS - ORGANISM - RESPONSE MODEL

The extant literature on the use of the S-O-R model is extensive, and is particularly prevalent in the study of consumer behaviour (Jacoby, 2002). In this context, the S-O-R model has been applied to the study of store atmospherics, shopper response and restaurant perceived quality (Donovan & Rossiter, 1982; Eroglu *et al.*, 2003; Jang & Namkung, 2009) More recently, the S-O-R model is applied in studies of online

behaviours particularly with regards to website usage, SNSs and online games (Kim & Lennon, 2013; Parboteeah *et al*., 2009).

The Stimulus–Organism–Response (S-O-R) model is an environmental psychology model and is used to analyse the mediating effect of emotional responses on the relationship between the environment and an individual's behaviour (Mehrabian & Russel, 1974; Mehrabian & Russel, 1980s). The S-O-R model is an evolution of the Input-Output (I-O) model, as it takes into account the internal (cognitive and affective) responses to external stimuli and its influence on behaviour which the I-O model does not (Mehrabian & Russel, 1974). The model has often been adapted for use in consumer behaviour studies as it is a useful framework to analyse the mediating effects of emotional responses on the relationship between consumer-targeted stimuli and consumer's subsequent behaviour (Jacoby, 2002). The following table provides some examples of previous studies in consumer behaviour using the S-O-R model:

TABLE 3.1: EXAMPLES OF CONSUMER BEHAVIOUR STUDIES USING THE S-O-R MODEL

Author(s)	**Date**	**Study**
Donovan & Rossiter	1982	Store Atmosphere: An Environmental Psychology Approach
Eroglu, Machliet & Davis	2003	Empirical testing of a model of online store atmospherics and shopper responses
Jang & Namkung	2009	Perceived quality, emotions, and behavioural intentions: Application of an extended Mehrabian – Russell model to restaurants
Parboteeah, Valacich, & Wells	2009	The Influence of Website Characteristics on a Consumer's Urge to Buy Impulsively
Huang	2012	Online Experiences and Virtual Goods Purchase Intention
Kim & Lennon	2013	Effects of reputation and website quality on online consumers' emotion, perceived risk and purchase intention: Based on the stimulus-organism-response model

From Table 3.1, studies by Donovan and Rossiter (1982) and Eroglu *et al*. (2003) focus on the effects of store atmospherics on shopper behaviour. Jang and Namkung (2009) apply the S-O-R model to the study of restaurants, specifically consumer's perceived quality of a restaurant, consumer's emotional responses to that restaurant, and their subsequent purchase behaviour. More recent studies by Parboteeah *et al*. (2009), Huang (2012), and Kim and Lennon (2013) apply the S-O-R model to the study of consumer behaviour in an online context. The conceptual model developed in this chapter was adapted from Huang (2012).

The S-O-R model implies that there are three stages in the process of an individual responding to stimuli. The first, Stimulus, is when an individual is exposed to a source of stimuli such as music, promotional advertisements or event alerts (Huang, 2012). The second stage, Organism, involves the internal response of an individual to the stimulus and encompasses how they think and feel about the stimulus (Jacoby, 2002; Mehrabian & Russell, 1974). Therefore, Organism, details the emotional response of the individual. The third stage, Response, involves the external response of the individual as a result of exposure to the Stimulus and Organism stages (Mehrabian & Russell, 1974; Jacoby, 2002; Huang, 2012). The basic S-O-R model (explained above) as well as Huang's (2012) adaptation of the model can be seen in Figure 3.1 below:

FIGURE 3.1: THE S-O-R MODEL

Basic S-O-R Model	Stimulus	Organism	Response
S-O-R model for SNSs (Huang, 2012)	*Interactivity:* Active Control Reciprocal Communication Social Identity	Flow *Involvement:* Cognitive Involvement Affective Involvement	Online Purchase Intent

The S-O-R framework is highly suitable to the study of consumer behaviour for three reasons. Firstly, the framework is flexible and permits countless numbers of modifications, additions or deletions (Jacoby, 2002). Secondly, it is useful for identifying the variables necessary for understanding the underlying psychological dynamics of individual consumer behaviour (Mehrabian & Russell, 1974, Mehrabian & Russell, 1980s). Lastly, it also makes it easier to identify, visualise and understand the relationships between these variables (Mehrabian & Russell, 1974; Jacoby, 2002).

However, the S-O-R Model has not been applied to the online gaming context. This study seeks to investigate the relationships between online game characteristics, the gameplay experience and the OPI of players with regards to IAPs.

For the purpose of this study, game characteristics can be seen as the online and offline features of a game. These include (but are not limited to) games controls, player chat features, co-operative play features, game difficulty and player skills. The gameplay experiences can be thought of as the level of engagement a player has with a game due to the characteristics of the game, as well as the subsequent cognitive and emotional responses to engaging with a game. As mentioned in the previous chapter, player IAPs are linked to gameplay and the gaming experience (Hahl, 2014) and that the OPI of IAPs is influenced by game characteristics and gameplay experience (Lovell, 2013; Narinen, 2014). Thus, this study argues that game characteristics can be seen as Stimulus, gameplay experience can be seen as Organism, and the OPI of IAPs can be seen as Response.

The S-O-R model proves useful for this particular study for three reasons. Firstly, the model provides sound theoretical justification for using web characteristics as environmental stimuli (Parboteeah *et al*., 2009). Secondly, it allows the link between a consumer's online experience and their virtual goods consumption to be analysed (Huang, 2012). Third, it allows for the study of virtual goods consumption as a state of mind that results from the exposure to environmental stimuli (Parboteeah *et al*., 2009).

However, before the S-O-R model can be applied to the study of online games, it is first necessary to understand how the model can be applied to a Computer Mediated Environment (CME). The S-O-R model was adapted by Huang (2012) in a study that examined the effects of interactive and social features on users' online experiences and their purchase intention of virtual goods from a SNS, namely Facebook. Online games and SNSs are both considered CMEs and thus share some characteristics (Hoffman & Novak, 1998; Siddiqui & Turley, 2006). Furthermore, Facebook also allows online games to be played within the SNS. Therefore, the S-O-R model as adapted for online social media is suitable for understanding the S-O-R model as applied to a CME.

The S-O-R model for SNSs is shown in Figure 3.1 above. As Huang's (2012) study focuses on SNS's, Facebook in particular, stimuli chosen for the model include the interactive features of Facebook (Interactivity), grouped as Active Control and Reciprocal Communication, and social factors, grouped as Social Identity. Organism has been operationalised as Flow and Involvement, namely Cognitive and Affective Involvement, and Response as Online Purchase Intention. Each of the constructs included in Figure 3.1 will be discussed in the following sections, starting with Interactivity.

3.2.1 Interactivity

In online games, social interactions of are necessary and games should have social interaction capabilities for players (Sweetser & Wyeth, 2005). Social interactions have been shown to be a strong elements of online games and some players will play a game for the social interactions, regardless of whether they actually like the game (Lazzaro, 2004).

The S-O-R model for SNSs classifies the stimuli in the model into two groups: interactivity and social identity (Huang, 2012). *Interactivity* (or social interactions) can be defined as the degree to which participants in a communication process have control over the exchange and can switch roles in their mutual discourse (Hoffman & Novak, 1996; Fortin & Dholakia, 2005; Huang, 2012). Thus, in order for any form of communication to be considered interactive, the participants in the communication process must be able to control who they are able to interact with in addition to having two-way channels of communication. Interactivity is therefore divided into two constructs, namely *Active Control* and *Reciprocal Communication* (Song & Zinkhan, 2008; Huang, 2012).

3.2.1.1 Active Control

Active control can be defined as the ability of an individual to choose who they interact with, when to interact and which information to take in when engaging in an online space (Lowry *et al.*, 2006). The ability to make decisions in determining outcomes or goals is considered to be an important factor in creating a compelling online experience (Ghani & Deshpande, 1994). This is because people tend to feel and behave more positively when they perceive to have more control over their environment (Csikszentmihalyi, 1990; Ghani & Deshpande, 1994).

In a virtual environment, namely Facebook, active control would refer to a Facebook user's ability to adapt their newsfeed, select which people to befriend, choose who to interact with, and select which Facebook apps to use. In an Online Gaming context, active control would refer to a player's ability to make gameplay choices and control which players they can interact and communicate with. Games with high active control, thereby allowing unrestricted actions during gameplay, greatly appeals to players as it enhances the gameplay experience (Animesh, Yang & Oh, 2011). High active control also allows players to be more selective of the information they choose to take in thus allowing players to become involved with a game at their own pace, leading to higher game enjoyment (Ariely, 2000). It is therefore preferable to have higher levels of active control in a game, as it leads to greater gameplay experience and game enjoyment.

3.2.1.2 Reciprocal Communication

Reciprocal Communication, the second interactivity measure, can be defined as the ability to communicate between two or more entities (Jiang *et al.*, 2010). Reciprocal communication implies a two-way communication stream where the participants involved are able to freely communicate with each other and with the CME administrators. The two-way communication takes the form of shared language, shared signs and signals, and the feedback to administrators (Duncan & Moriarty, 1998).

Reciprocal communication in Facebook would take the form of the messenger function, the ability to comment on statuses, the ability communicate with other Facebook app users, and the ability to direct feedback and complaints to Facebook administrators. In Online Gaming, reciprocal communication would refer to the ability to freely communicate with another player and to have that player able to return any form of communication. It would also refer to being able to relay feedback to game developers and game administrators.

Reciprocal Communication is thought to reduce relationship uncertainty (Berger & Calabrese, 1975) and strengthen the relationships between participants, and participants and administrators (Duncan & Moriarty, 1998). Indeed, increased communication with participants in CMEs is thought to be necessary for building strong relationships with those participants (Kalakota & Whinston, 1996). Participants who

communicate with administrators have also been shown to have more control over the information they can collect (Hoffman & Novak, 1996). Therefore, effective reciprocal communication may result in greater gameplay enjoyment and a stronger connection to a game.

Interactivity is thought to trigger the flow experience and greater gameplay experience is thought to increase game involvement (Novak *et al*., 2000). Therefore, Active Control and Reciprocal Communication are positive influencers of Flow. The final construct in the Stimulus stage of the S-O-R model, Social Identity, is discussed next.

3.2.2 Social Identity

Social Identity can be defined as a user's self-esteem and commitment to groups, as well as the way they identify with a particular group in terms of the characteristics attributed to that group (Dutton *et al.*, 1994; Dholakia & Chiang, 2003; Yujong, 2008; Kwon & Wen, 2009). Social Identity therefore refers to the way an individual can identify with a particular group based on their ability to recognize similar characteristics to their own, and subsequently commit and immerse themselves into that group. Identification with a group and assimilation into that group can positively influence the emotional and behavioural responses of members of that group (Markus & Wurf, 1987).

Social Identity in Facebook would refer individual Facebook profiles, the pages (of online communities) joined and any social apps used. In Online Gaming, social identity would refer to a player's ability to relate to player groups, the ability to join player groups and the level of commitment to a specific player group. These player groups are often referred to as 'guilds' and players within the group work together to accomplish game objectives (Debeauvais *et al*., 2012; Narinen, 2014).

Social influences in CMEs is thought to be able to affect how a CME user sees the products adopted by those in their online social circle (Turner, 1982; Huang, 2012). The degree of influence is affected by circumstance (Cheung & Lee, 2010). For example, in an online game, a new player may feel more pressure to assimilate into the current player base while existing player may feel a greater need to emulate the players with the greatest social influence.

The development of Social Identity occurs when players begin to assess the characteristics of other players in an effort to identify with other player groups (Huang, 2012). These players will identify and evaluate in-game similarities and out-group distinctiveness in order to compare themselves to other players and development their own social identity within a game (Turner, 1982; Huang, 2012). This social identity will then guide the behaviour and feelings of a player as they navigate through the social aspects of a game (Markus & Wurf, 1987). A player's social identity can also be either negative or positive and will determine whether they choose to remain within a group in the game, or in the game itself (Animesh *et al.*, 2011; Huang, 2012). A positive social

identity will result in increased need to be part of a group and will result in increased immersion and enjoyment in a game. Thus, Social Identity has a positive influence on Flow.

The Stimulus constructs *Active Control*, *Reciprocal Communication* and *Social Identity* all influence the Organism construct Flow (Cole & Griffiths, 2007; Hoffman & Novak, 2009; Huang, 2012). As stated above greater levels of *Active Control*, *Reciprocal Communication* and *Social Identity* will influence increased response. The constructs in the Organism stage of the S-O-R model, seen in Figure 3.1, Flow and Involvement, in the form of Cognitive and Affective Involvement, are discussed in the sections to follow.

3.2.3 Flow

In the S-O-R model, Organism refers to an individual's organic experiences as a consequence of exposure to an environmental stimulus, and includes aspects such as flow, involvement, cognitive network and schema (Huang, 2012). Therefore, Organism can be thought of as the thoughts and emotions that are experienced as an individual interacts with and reacts to Stimuli. Mathwick and Rigdon (2004) argue that stimuli induce a state of mind that may affect experiential outcomes either positively or negatively. Memorable experiences may serve to strengthen relationships and influence consumer attitudes (Deighton & Grayson, 1995). A positive experience may then influence a person to increase their level of interaction with the stimuli and, as a result, become more involved with it (Huang, 2003). This implies that in Online Gaming, a positive reaction to a game may increase a player's willingness to play or their 'involvement' with that game.

In the S-O-R model for SNSs, the constructs of Organism are: *Flow*, *Affective Involvement* and *Cognitive Involvement*. Each of these constructs have been shown to yield a strong influence on purchase intention (Jiang *et al*., 2010; Huang, 2012). Therefore, higher levels of flow and involvement with a game may influence a player's OPI.

The first Organism construct, *Flow*, was first proposed by Csikszentmihalyi (1975) and was described as being an intrinsically motivated optimal state, or as a holistic sensation felt when acting with total involvement. Flow has since been extensively studied and modelled (Hoffman & Novak, 1996; Novak *et al*., 2000; Hoffman & Novak, 2009), and has also been applied to many studies in online experience (Mathwick & Rigdon, 2004; Schneider & Cornwell, 2005; Sweetser & Wyeth, 2005; Korhonen *et al.*, 2009). A conceptual model analysing flow, the Network Navigation in Hypermedia CME Model, was discussed in the previous chapter and the most recent adaptation of the model can be seen in Figure 2.3.

The theory of flow suggests that there are three conditions that need to be met in order to achieve a state of flow (Cszikzentmihayli, Abuhamdeh & Nakamura, 2005) Firstly,

one must be involved in an activity with a clear set of goals and progress. Secondly, the task at hand must have clear and immediate feedback. Finally, one must have confidence in one's ability to complete the task at hand. Therefore, in order to enter a state of flow while engaging with a CME, a person must first understand what it is they need to achieve when engaging with the CME and then be able to assess their progress. In understanding the task and recording progress, CME users are able to gauge their ability to complete tasks and identify where they need to improve their abilities (Cszikzentmihayli *et al*., 2005).

The Network Navigation in Hypermedia CME Model (see Figure 2.3), measures flow using constructs identified with the above conditions required for the flow experience (Hoffman & Novak, 1996; Hoffman & Novak, 2009). Using the conditions, the model identifies three sets of characteristics required for the measurement of flow: Content Characteristics, Process Characteristics and Control Characteristics (Hoffman & Novak, 1996) (see Figure 1.2).

Content Characteristics refer to the actual content of an online environment, such as the game interface or the chat function of a SNS, and in the S-O-R model would refer to the constructs Active Control and Reciprocal Communication (Hoffman & Novak, 1996; Huang, 2012). Process Characteristics refer to the emotional and experiential responses made by an individual and would therefore refer to the constructs Cognitive Involvement and Affective Involvement (Hoffman & Novak, 1996) which will be discussed in the following section. Content and Process characteristics fulfil the first two conditions required for achieving a state of flow.

Control Characteristics are elements of flow that can be controlled, either by an individual or the online environment they are engaged in (Hoffman & Novak, 1996). Control Characteristics include two constructs: *Skill* and *Challenge* (Hoffman & Novak, 1996; Mathwick & Rigdon, 2004; Hoffman & Novak, 2009). Control characteristics fulfil the third condition required for achieving a state of flow. The S-O-R model for SNSs focuses on the social aspects of CMEs and thus only focuses on Content and Process characteristics of Flow (Huang, 2012). Content characteristics however, are more relevant to online games as they allow interesting gameplay and greater gameplay enjoyment (Mathwick & Rigdon, 2004; Hahl, 2014; Kuusisto, 2014; Narinen, 2014; Vankka, 2014).

Flow is seen as being an engrossing and enjoyable experience that can lead to the development of positive emotions while in a state of flow (Hoffman & Novak, 1996; Huang, 2003; Guo & Barnes, 2009). As such, a heightened flow experience may lead to greater emotional involvement with a game. Flow is also linked to greater learning, increased curiosity, positive experiences and increased purchase intention (Hoffman & Novak, 2009). Thus, the flow experience may result in higher levels of cognition with regards to the game and gameplay. Individuals in a state of flow are more likely to become increasingly immersed in an online environment and therefore become more focused on online interactions (Hoffman & Novak, 2009; Huang, 2012; Hahl, 2014).

As a result, a state of flow may lead to greater involvement with a game. Therefore, flow has a positive influence on involvement, namely Cognitive and Affective Involvement. Involvement is detailed in the following section of this chapter.

3.2.4 Involvement

Involvement can be defined as a motivational state that affects consumers' attention, comprehension processes and overt behaviours (Celsi & Olsen, 1988). In online games, players should experience deep and effortless involvement (Sweetser & Wyeth, 2005) which can result in loss of concern for self, everyday life and an altered sense of time (Csikszentmihalyi, 1990). The game should have capacity to increase player involvement emotionally and viscerally (Sweetser & Wyeth, 2005). Indeed, a heightened level of involvement is reported by the players of online games and the people who observe them (Johnson & Wiles, 2003).

Involvement is shown to be able to influence consumer behaviour (Jiang *et al.*, 2010) and also has a moderating effect on purchase intention (Eroglu *et al*., 2003). This implies that it is a player's level of involvement with a game that will influence their OPI. Involvement is also shown to be influenced by Flow, as a higher level of involvement may lead to increased immersion in the online experience (Hoffman & Novak, 2009; Novak *et al*., 2000). Park and Young (1986) proposed that involvement be defined as two distinct constructs: *Cognitive Involvement* and *Affective Involvement*.

3.2.4.1 Cognitive Involvement

Cognitive Involvement is induced by utilitarian or cognitive motives and as such, can be defined as the cognitive motivations affecting a consumer's attention, comprehension processes and overt behaviours (Celsi & Olsen, 1988; Putrevu & Lord, 1994). Therefore, Cognitive Involvement can be seen as the cognitive response of a consumer when triggered by a stimulus. When applied to online games, Cognitive involvement can be seen as the thought processes involved while playing a game as well as what players think of game once they have played it.

Cognitive Involvement is influenced by flow when a CME allows for greater learning, increased curiosity, and results in positive experiences and memories (Hoffman & Novak, 1996). Increased involvement is also shown to have a strong influence on OPI (Jiang *et al*., 2010; Huang, 2012). However, Cognitive Involvement has been shown to have a negative influence on OPI (Huang, 2012; Chan, Cheung & Lee, 2017). The negative influence of Cognitive Involvement shows that online purchases are less likely with increased cognition and implies that online purchases may be impulse purchases.

Positive experiences and memories are also shown to lead to greater levels of emotional involvement with a CME (Novak *et al*., 2000; Hoffman & Novak, 2009). Indeed, many theories of emotion generation in an online context emphasize the role

of cognition in emotion generation (Isen, 1993; Roseman & Smith, 2001; Hudlicka, 2008). Traditionally, cognition and emotion were seen as entirely separate constructs (Krathwohl, Bloom & Masia, 1956). Subsequent research has shown that cognition and emotion are inextricably linked (LeDoux, 1999) and that there are connections between emotion and the cognitive processes of attention, memory and decision-making (Clore & Gasper, 2000; Palombo Weiss, 2000). Cognition and emotion have a positive relationship and increased cognition can illicit greater emotional response, while emotional responses can in turn influence cognition processes like learning (O'Regan, 2003).

In online games, learning during gameplay and the positive gaming experiences as a result of enjoyable gameplay can lead greater involvement with a game (Hoffman & Novak, 2009) and can generate positive emotional responses (Hudlicka, 2008). Therefore, Cognitive Involvement has a positive influence on Affective Involvement.

3.2.4.2 Affective Involvement

Affective Involvement is derived from value-expressive or affective motives and as such, can be defined as the emotive motivations affecting a consumer's attention, comprehension processes and overt behaviours (Celsi & Olsen, 1988; Putrevu & Lord, 1994). Thus, Affective Involvement can be seen as the emotional response triggered in a consumer by a stimulus. Affective involvement in online games can be seen as the emotions elicited while playing a game and the emotional connection to a game once it has been played.

Emotion is crucial to game design as it plays an important role in the development of player experience (Hudlicka, 2008). Affective game design can be used to trigger select emotional responses and manipulate a player's engagement and involvement with a game (Sykes & Brown, 2003; Gilleade, Dix & Allanson, 2005). Game characteristics like game art, game content, game tasks and in-game social activity all elicit emotional responses from players and can influence player engagement levels (Hudlicka, 2008). Therefore, careful design of game characteristics can lead to greater emotional responses and consequently greater emotional involvement. Players are often shown to have high levels of emotional investment in a game due to the time and effort put into playing the game (Brown & Cairns, 2004; Sweetser & Wyeth, 2005).

Affective Involvement is positively influenced by flow when a state of flow leads to the development of positive emotions during interaction with a CME (Hoffman & Novak, 1996; Huang, 2003; Guo & Barnes, 2009). Affective Involvement is also positively influenced by Cognitive Involvement as cognition and emotion generation are shown to be linked (Isen, 1993; O'Regan, 2003; Roseman & Smith, 2001).

While both Cognitive and Affective Involvement is shown to have an influence on OPI, Affective Involvement is shown to have a positive influence on OPI as opposed to Cognitive Involvement, which has a negative influence (Jiang *et al*., 2010; Huang, 2012; Chan *et al.*, 2017). Additionally, Affective Involvement has been shown to have

the stronger influence on OPI than Cognitive Involvement has on OPI (Huang, 2012). This implies that the feeling an online experience elicits is more likely to result in an online purchase than immersion into the experience or thought processes around the experience (Wang, Wang & Farn, 2009). A player in an online game may, therefore, be more likely to make IAPs when experiencing positive emotions and a sense of immersion in the game world (Hahl, 2014).

The S-O-R model, presented in Figure 3.1, has been discussed in terms of the Stimulus constructs, namely Active Control, Reciprocal Communication and Social Identity, and how these constructs influence the Organism construct Flow. The Organism constructs discussed thus far include Flow and its influence on Involvement, namely Cognitive and Affective Involvement. Lastly, this section detailed Involvement and the influence Cognitive Involvement has on Affective Involvement. The final stage of the S-O-R model is Response which comprises only one construct, the dependant variable of the study, Online Purchase Intent (OPI). OPI is discussed in the following section.

3.2.5 Online Purchase Intention

The final stage of the S-O-R model is Response. Response can be defined as the external responses, in terms of behaviour and attitude, of an individual after they have been affected by a stimuli and have had the opportunity to process the effect of that stimuli cognitively and emotionally (Jacoby, 2002; Huang, 2012). In the S-O-R model for SNSs, the Response construct was *Online Purchase Intent* (OPI).

Purchase Intention can be defined as a customer's willingness to buy a certain product or service (Mirabi *et al.*, 2015) and is regarded as one of the motivational components of behaviour (Azjen, 1991). *Online purchase intention* can thus be defined as a customer's willingness to purchase products or services through a website (Chen *et al.*, 2010).

Purchase intention and Online Purchase Intention (OPI) is the extent of the conscious effort exerted by consumers with regards to their purchasing behaviour (Azjen, 1991; Brown, Pope & Voges, 2003) and thus proves useful to the study of consumer behaviour (Thapa, 2011). The analysis of purchase intention is complex as it is related to a number of factors - such as behaviour, perceptions and attitudes – and is dependent on the context of the study (Mirabi *et al*., 2015). For example, in the study of purchase intention towards a particular brand, it may be necessary to analyse brand awareness, brand attitudes and brand perceptions with regards to purchase intentions for that brand (Khraim, 2011). In the study of purchase intention in retail stores it may be necessary to analyse store locations, store layout and merchandise sold (Brown *et al.*, 2003). Thus, the study of purchase intention can be unique to each study and the particular elements being analysed. Regardless, purchase intention is an effective tool to predict buying process (Mirabi *et al*., 2015).

In the S-O-R model for SNSs, OPI is influenced by involvement and the results of the study show that OPI is positively influenced by Affective Involvement while it is negatively influenced by Cognitive Involvement (Huang, 2012; Chan *et al.*, 2017). The purpose of this study however, is to analyse OPI in the context of online gaming. As such the S-O-R model was adapted specifically for the study of online gaming. Given that Affective Involvement has a stronger influence on OPI than Cognitive Involvement (Huang, 2012) and that emotion is crucial for greater immersion into a game (Sweetser & Wyeth, 2005; Hudlicka, 2008), in the S-O-R model for online gaming OPI is positively influenced by Affective Involvement only. The S-O-R model for online gaming has a number of additional adaptions to the model, each of which will be explained in the sections to follow.

3.3 CONTROL CHARACTERISTICS FOR ONLINE GAMING

The S-O-R framework is flexible and permits countless numbers of modifications, additions or deletions (Jacoby, 2002). As such, it is possible to adapt the S-O-R model to be suitable for use in Online Gaming. In this regard, the gaming characteristics of Skill and Challenge, known as Control Characteristics in the Flow model (Hoffman & Novak, 1996), prevalent in online games, will be discussed for use in the model.

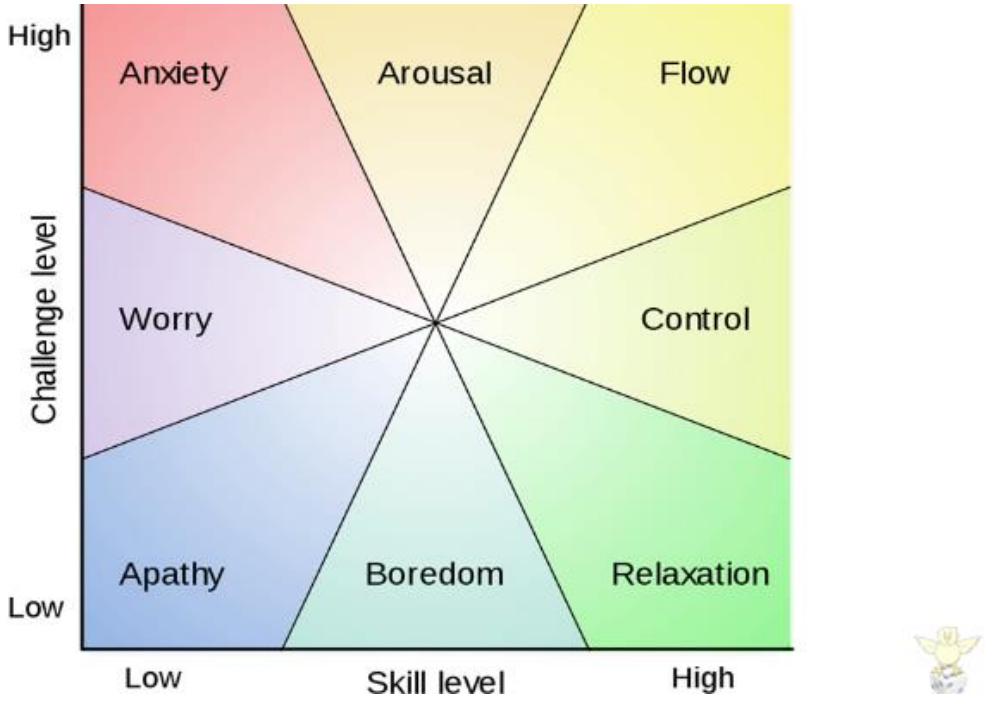
The Flow model was also used by Huang (2012) in developing the S-O-R model for SNSs. The Flow model is composed of three sets of characteristics: Content Characteristics, Process Characteristics and Control Characteristics (Hoffman & Novak, 1996) (refer to Figure 1.2). Content Characteristics refer to the actual content of an online environment, such as the game interface of a game or the chat function of a SNS, and in the S-O-R model would refer to the constructs Active Control and Reciprocal Communication (Hoffman & Novak, 1996; Huang, 2012). Process Characteristics refer to the emotional and experiential responses made by an individual and would therefore refer to the constructs Cognitive Involvement and Affective Involvement (Hoffman & Novak, 1996) described in the S-O-R model.

As mentioned previously, Control Characteristics are elements of the Flow model that can be controlled, either by an individual or the online environment they are engaged in and include two constructs: *Skill* and *Challenge* (Hoffman & Novak, 1996; Mathwick & Rigdon, 2004; Hoffman & Novak, 2009). Skill can be defined as a consumer's capacity for action and Challenge can be defined as the opportunities for action available to the consumer in a CME (Hoffman & Novak, 1996). In online games, challenge would refer to the tasks set in gameplay and the level of difficulty those tasks are set at. It would also refer to the game controls and how easy they are to use. Skill would refer to a player's ease of use with regards to game controls as well as the ability to complete the tasks set in gameplay.

Skill and Challenge have a congruent relationship and work in synchronicity to achieve a state of Flow (Hoffman & Novak, 1996; Mathwick & Rigdon, 2004). The interactions between the levels of Skill and Challenge, and how they influence flow can be seen in

Figure 3.2 below. In Figure 3.2, the ideal interactions for reaching a state of Flow is where both Skill levels and Challenge levels are high. However, states of being that are still preferable include Arousal, Control and Relaxation. The states that should be avoided are Anxiety, Worry, Apathy and Boredom. Therefore, balancing the levels of skill and challenge in a CME is crucial to the achievement of a state of flow (Csikszentmihalyi, 1990; Csikszentmihalyi, 1997).

FIGURE 3.2: THE SKILL-CHALLENGE GRID



SOURCE: Csikszentmihalyi (1997)

In online games, if Skill is greater than Challenge it can lead to boredom, whereas if Challenge is greater than Skill it can lead to anxiety (Mathwick & Rigdon, 2004). Therefore, for a player to achieve a state of Flow in an online social game, the challenge offered by the game needs to match the level of skill of the player. If a player can satisfactorily overcome the challenges presented by a game with their current level of skill, they are more likely to immerse themselves with the game (Hahl, 2014; Narinen, 2014). If players become bored or frustrated, they may, instead, choose to abandon the game (Mathwick & Rigdon, 2004).

Challenge is, thus, a crucial element in keeping gameplay interesting and enjoyable (Hahl, 2014). A player's level of skill improves over time and game challenges therefore, need to rise to meet it (Hahl, 2014; Narinen, 2014), in order to ensure a state of flow is reached. Challenge creates goals for players to achieve and offering them at different levels of difficulty allows them to match evolving levels of skill (Brown, 2010). Goals and achievements offer greater immersion into a game leading to

heightened states of flow (Mathwick & Rigdon, 2004) which in turn promotes higher levels of involvement (Marchand & Hennig-Thurau, 2013; Hahl, 2014).

Since Skill and Challenge work in synchronisation to achieve a state of Flow (Mathwick & Rigdon, 2004), it can be argued that equal changes in both Skill and Challenge, *ceteris paribus*, will lead to a similar change in Flow. Therefore, increasing Skill and Challenge would lead to a heightened state of Flow and thus indicates positive relationships between Skill, Challenge and Flow. Skill and Challenge are therefore useful constructs for use as environmental stimuli in an S-O-R model for Online Gaming as they are both important elements of gaming that can influence Flow.

3.4 THE S-O-R MODEL FOR ONLINE GAMING

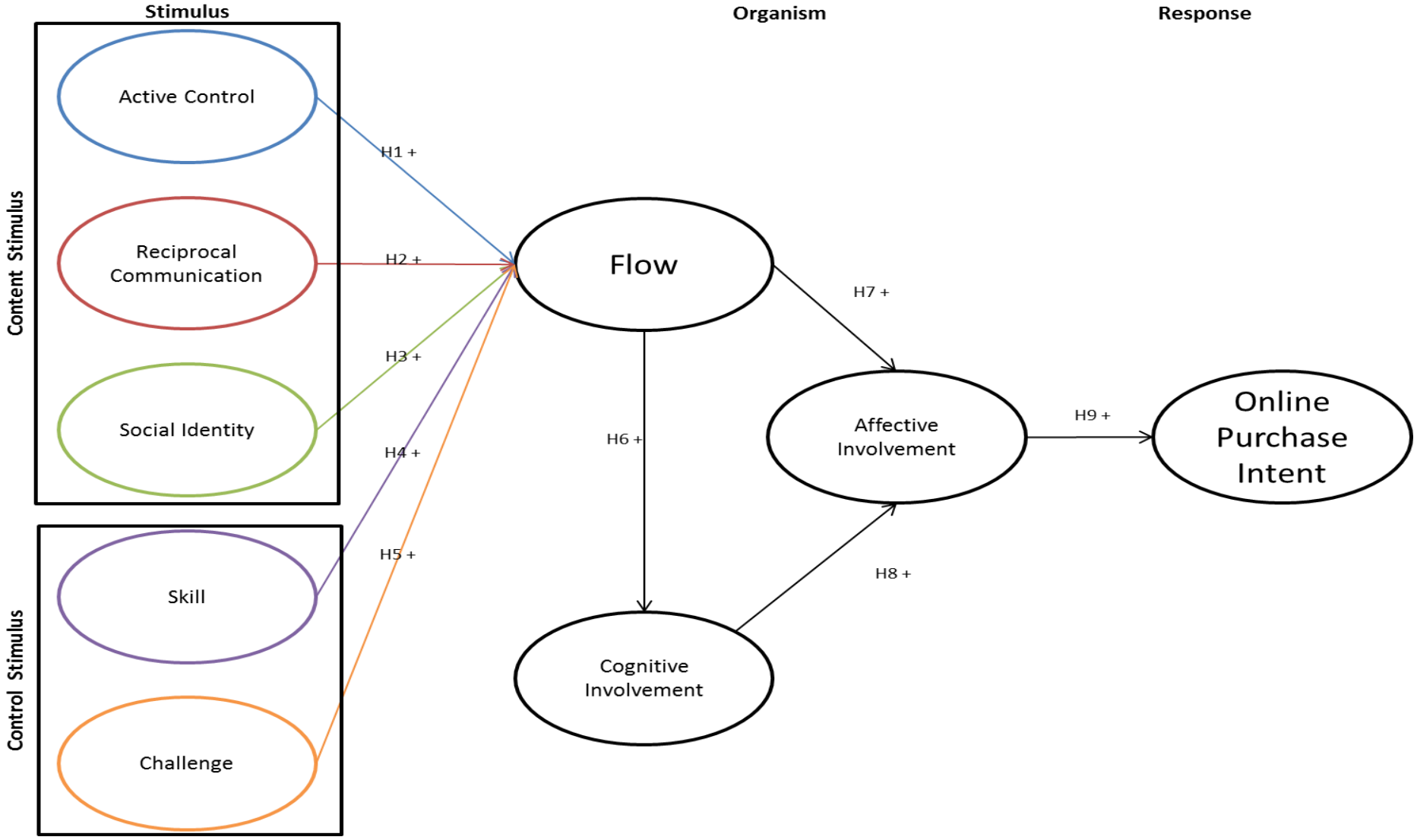
The previous sections of this chapter discussed the S-O-R model as shown in Figure 3.1, how it has been adapted for online social media, and the constructs present in the model. The purpose of this study is to investigate the relationships between the characteristics of online games, the gameplay experiences of players and the OPI of players with regards to IAPs. In this regard, the study makes use of the S-O-R model to investigate these relationships and has thus been adapted to the study of online gaming.

The S-O-R model proves useful to this study for four reasons. Firstly, as stated previously, it provides a sound theoretical justification for using the characteristics of a CME as environmental stimuli (Parboteeah *et al.*, 2009). Secondly, it is a flexible model that easily permits modifications and adaptations to be made (Jacoby, 2002). Thirdly, it allows for the analyses of OPI for IAPs with regards to both the characteristics of a game and the experience of playing it (Huang, 2012). Lastly, it allows for the analyses of the relationships between characteristics of games and their players, the state of mind elicited by the playing of that game, and the reactions of players as a result of that state of mind (Parboteeah *et al.*, 2009; Huang, 2012). Simply put, it provides a means to link the playing of a game and the experience of playing that game to OPI.

The S-O-R model studies consumer behaviour in three stages: Stimulus, Organism and Response. In the S-O-R model for SNSs, Stimulus constructs included *Active Control*, *Reciprocal Communication* and *Social Identity*. The Organism constructs included *Flow*, *Cognitive Involvement* and *Affective Involvement*. Lastly, the Response construct of the model was *Online Purchase Intent.* When applied to the study of online gaming, the S-O-R model has been adapted further. The S-O-R model as adapted for Online Gaming is presented in Figure 3.3 on the next page.

The S-O-R model for online gaming includes the Stimulus constructs Active Control, Reciprocal Communication, Social Identity and two additional constructs, Skill and Challenge. Active Control and Reciprocal Communication are both constructs belonging to Interactivity. Greater Interactivity triggers the flow experience (Novak *et*

FIGURE 3.3: THE S-O-R MODEL FOR ONLINE GAMING



SOURCE: Adapted from Huang (2012) and Hoffman & Novak (2009).

al., 2000), thus greater Active Involvement and Reciprocal Communication can lead to heightened states of flow. Therefore, Active Control and Reciprocal Communication have a positive influence on Flow. A positive Social Identity can lead to greater gameplay experience and immersion. Therefore Social Identity has a positive influence on Flow.

With higher levels of Skill, game players are more likely to overcome game challenges and thus become more immersed in a game (Hahl, 2014; Narinen, 2014). Skill thus has positive influence on Flow. In online games, Challenge involves creating goals and achievement that may lead to greater immersion in a game (Mathwick & Rigdon, 2004). Challenge therefore has a positive influence on Flow. As such, all Stimulus constructs in the S-O-R model for online gaming have a positive influence on Flow and give the following hypotheses:

H_1: Active Control has a positive influence on Flow.

H_2: Reciprocal Communication has a positive influence on Flow.

H_3: Social Identity has a positive influence on Flow.

H_4: Skill has a positive influence on Flow.

H_5: Challenge has a positive influence on Flow.

The Organism constructs of the model include the constructs *Flow*, *Cognitive Involvement* and *Affective Involvement*. Flow leads to the development of positive emotions (Hoffman & Novak, 1996; Huang, 2003; Guo & Barnes, 2009) and is linked to greater learning, increase curiosity and positive experiences and memories (Hoffman & Novak, 2009). Thus, Flow has a positive influence on Cognitive Involvement and Affective Involvement. Greater Cognitive Involvement can also lead to greater Affective Involvement (Isen, 1993; Roseman & Smith, 2001; O'Regan, 2003). Thus, Cognitive Involvement has a positive influence on Affective Involvement and mediates the relationship between Flow and Affective Involvement. This leads to the following hypotheses:

H_6: Flow has a positive influence on Cognitive Involvement.

H_7: Flow has a positive influence on Affective Involvement.

H_8: Cognitive Involvement has a positive influence on Affective Involvement.

Finally, Involvement has been shown to have a strong influence on purchase intention (Jiang *et al*., 2010; Huang, 2012) and Affective Involvement in particular is shown to have a greater influence on purchase intention (Wang *et al.*, 2009; Huang, 2012; Chan *et al.*, 2017). Thus Affective Involvement has a positive influence on the only Response construct, *Online Purchase Intention*. This leads to the final hypothesis:

H_9: Affective Involvement has a positive influence on Online Purchase Intention.

The S-O-R model for online gaming will be used to test all the hypotheses as presented from H_1 to H_9 in order to answer the research questions of this study. The conceptual model will be used in the analysis conducted in Chapters 5 and 6.

3.5 CONCLUSION

This chapter concludes the literature review of online gaming industry and the S-O-R model for online gaming. This chapter and the previous chapter both serve as the theoretical foundations for this study and to guide the researcher while conducting the research. In this chapter, a comprehensive literature review of the S-O-R model was conducted in order to form the theoretical foundations for this study and develop a conceptual model for OPI in online gaming. In this regard, the chapter discusses the S-O-R model and its relevance to the study of consumer behaviour. The chapter also discusses how the S-O-R model can be applied to CMEs and reviews the S-O-R model for SNSs (Huang, 2012).

The chapter discussed each construct of the S-O-R model for SNSs in a chronological order, starting with the Stimulus constructs then the Organism constructs and finally, the Response constructs. The model analysed how Stimuli in online social media, such as the ability to communicate with other SNS members and the ability form social groups within the SNS, can influence the level of involvement with the SNS and can effect a deeper engagement with the medium. The model then proposed that higher involvement can influence the OPI of IAPs in an SNS. The purpose of this study however, is to analyse OPI in online games and the S-O-R model for SNSs formed the theoretical foundation for the development of a proposed S-O-R model for online games. The chapter introduced two additional Stimulus constructs: Skill and Challenge, which are stimuli present in online games. Finally, the chapter discussed the S-O-R model for online gaming and draws together the relevant literature discussed in order to form a conceptual model (Figure 3.3) for use in analysis for this study. It also highlighted the adaptions the model has made to move from one CME (an SNS) to another (an online game). In the chapters to follow, the methodology used in this study is reviewed followed by the statistical findings of the study and finally, a discussion of the findings and their implications.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 INTRODUCTION

The preceding chapters of this study investigated extant literature on the online gaming industry and the S-O-R model, and presented an argument towards using the S-O-R model in the online gaming industry. The investigation into existing literature on online gaming and the S-O-R model resulted in the formation of a conceptual model (Figure 3.2) which was used in the analysis of this study. This chapter discusses the methodological considerations of this study and the justifications for using them.

This chapter begins with an argument of the research design and method used to investigate the stated hypotheses. The research design describes the ways of collecting data in marketing research as well the specific research design and method used for this study. Following this is an analysis of sampling design, detailing the sampling method and target population used in this study. Next, the measurement instrument and scales used are discussed in detail. Thereafter follows a brief description of the data collection process used in this study.

Lastly, the statistical analysis and techniques are discussed in detail: First, the descriptive and inferential statistical methods are discussed, namely the use of Structural Equation Modelling, followed by an analysis and justification for using the PLS-SEM approach of SEM. This chapter serves as the foundation of the study in terms of how the study was designed, the measurement instrument used, how data was collected and analysed.

4.2 RESEARCH DESIGN AND METHOD

Research design serves as a framework for conducting marketing research (Malhotra, 2010). It can be divided into exploratory research and conclusive research, the latter of which can be further divided into descriptive research and causal research (Bryman & Bell, 2017). The design chosen to conduct a research study is dependent on the specific questions the research seeks to answer as well as the type of data required for analysis.

The data used in research can be divided into two categories: primary data and secondary data. Primary data is collected by the researcher for the specific purpose of addressing the research problem of a study (Malhotra, 2010; Zikmund & Babin, 2010). Secondary data is existing data that had been collected for purposes other than the research problem (Malhotra, 2010).

The purpose of exploratory research is to provide insights into, and an understanding of, the problem confronting the researcher (Malhotra, 2010). The information required only needs to be loosely defined and the primary data is qualitative in nature (Bryman & Bell, 2017). Depending on the outcome of the research, exploratory research may be followed by conclusive research or may require further exploratory research.

Furthermore, exploratory research may also include the analysis of secondary data. Secondary data is useful for a number of reasons. Firstly, it can assist in identifying and defining the research problem. Secondly, it can assist in developing an appropriate research design and method. Finally, it can assist in the interpretation of primary data (Bryman & Bell, 2017). Given the advantages of secondary data, Malhotra (2010) recommends that secondary data is analysed as a prerequisite to the collection of primary data. In this study, secondary data has been examined in the literature review of the previous chapters.

Conclusive research design is a structured form of research design that is used to test hypotheses and examine the relationships between constructs (Malhotra, 2010; Saunders, Lewis & Thornhill, 2007). Unlike exploratory research, the information needed for conclusive research is clearly defined and requires quantitative methods for data analysis (Saunders *et al*., 2007). As such, conclusive research requires the use of primary data (Malhotra, 2010). Conclusive research design is further divided into Descriptive research design and Causal research design.

As the name implies, the purpose of descriptive research design is to attempt to describe something using the information collected (Bryman & Bell, 2017). Examples of such include the characteristics of a specific group of consumers, determining population percentages and making specific predictions (such as a sales forecast) (Malhotra, 2010). Descriptive research design is further divided into two more categories: Cross-sectional design and Longitudinal design. Cross sectional design involves gathering information from one or more samples of respondents only once, though the information may be gathered over an extended period of time. Longitudinal design involves gathering information from a single sample of respondents repeatedly, often over a set period of time (Cooper & Schindler, 2008).

Causal research design is used to determine the nature of cause and effect relationships (Malhotra, 2010). In this regard, causal research design is used to determine which variables are the cause (known as independent variables) and which variables are the effects (known as dependant variables) resulting from a specific phenomenon (Malhotra, 2010; Zikmund & Babin, 2010). Causal research can also be used to then determine the nature of the relationship between the cause and effect variables (Malhotra, 2010).

The purpose of this study was to study the behaviour of consumers with regards to their purchase behaviour in online games. In this regard, the study analyses OPI as it is influenced by game players interaction with a game and their responses to game stimuli. As such, this study attempted to describe the behaviour of consumers who play online games. Therefore, this study made use of a conclusive, descriptive research design as the intentions of this study are to describe the relationships between each of the constructs in the S-O-R model for online social game (Malhotra, 2010). Furthermore, the study made use of a cross sectional descriptive research design, as the data was collected only once from a single sample of respondents over a short period of time.

Descriptive research design is carried out using the survey method of data collection and gathers data using a structured questionnaire as the measurement instrument, given to a specific sample of a population (Shiu *et al*., 2009). Surveys are a method of obtaining information from a sample population through the use of a structured questionnaire that has been design to elicit the specific information required from respondents (Malhotra, 2010). Structured questionnaires are formal questionnaires that presents respondents with questions in a prearranged manner (Malhotra, 2010). Additionally, structured questionnaires often employ the use of fixed alternative questions such that respondents are only required to select from a set of predetermined answers (Malhotra, 2010). The measurement instrument and sampling employed in this study is discussed in later sections of this chapter.

The survey method of data collection has a number of advantages as a research method (Shiu *et al*., 2009; Malhotra, 2010). Firstly, it allows the questionnaire to be administered simply. Secondly, the data obtained is reliable as the responses obtained are usually limited to fixed alternatives. Finally, the preparation, analysis and interpretation of the data gathered is relatively simple.

There are a number of survey methods that can be used in data collection and they are classified according to the method in which they are administered to respondents (Malhotra, 2010). There are four methods of survey administration: postal interviews, telephonic interviews, personal (Face-to-Face) interviews and online interviews (Zikmund & Babin, 2010; Bryman & Bell, 2017). The advantages and disadvantages of each method is summarized in Table 4.1 below.

TABLE 4.1: THE STRENGTHS AND WEAKNESSES OF SURVEY METHODS

	Postal	**Telephonic**	**Personal**	**Online**
Flexibility	Weak	Acceptable	Strong	Acceptable
Quantity of data that can be collected	Acceptable	Mediocre	Strong	Acceptable
Control of interviewer effects	Strong	Mediocre	Weak	Mediocre
Control of sample	Mediocre	Strong	Acceptable	Strong
Speed of data collection	Weak	Strong	Acceptable	Strong
Response Rate	Mediocre	Acceptable	Acceptable	Mediocre
Cost	Acceptable	Mediocre	Weak	Strong

SOURCE: Tull & Hawkins (1993)

In Table 4.1, the strengths and weaknesses of survey methods are compared on a number of categories. The flexibility of a survey method refers to the types of information and the situations the method can be used for (Tull & Hawkins, 1993). Therefore, high flexibility means that a survey method can collect many types of data in many different situations. The quantity of data refers to the amount of data that can

be collected before a respondent begins to bore or tire of answering the survey questions (Tull & Hawkins, 1993; Golestaneh, 2010). Control of interviewer effects refers to the ability to control the effect the presence of an interviewer may have on a respondents responses (Golestaneh, 2010). Control of sample refers the ability to select and target the correct population for the research sample (Tull & Hawkins, 1993). Speed of data collection refers to how quickly the data can be collected (Golestaneh, 2010). Response rate refers to how a respondent is to answer the survey questionnaire (Golestaneh, 2010). Lastly, cost refer to the monetary costs required to carry out the research (Golestaneh, 2010).

This study required information from consumers who play online games with IAP functionality. Therefore, the survey method for the study needed high control of the sample. Furthermore, the method had to be suitable for collecting larger amounts of data over a short period of time. Given the requirements of the study and the fact that consumers who play online games are frequently online, an online survey method was chosen for this study.

The measurement instrument for the study, a structured online questionnaire, was prepared using the online survey platform, Qualtrics (Qualtrics, 2005). There are a number of online survey platforms available for use in online survey research such as Survey Monkey and Checkbox survey. Qualtrics was selected as the survey platform as it is the platform the researcher is most familiar with. Furthermore, Qualtrics is a free to use platform that does not restrict the number of questions available to the researcher and allows for the use of filter questions and question redirection (Qualtrics, 2005).

The following section discusses the target population and sampling approach used in the study.

4.3 TARGET POPULATION AND SAMPLING APPROACH

The objective of marketing research is to obtain information on a market in an attempt to describe the characteristics of the market. The scale and cost of conducting research on the entire population of a market is extremely high. Therefore researchers, make use of a small sample of the population as respondents for a research study. A sample is defined as being a subgroup of a population selected for participation in a research study (Malhotra, 2010). The data obtained from the sample is analysed statistically and inferences are made about the population as a whole.

The sampling design of a study comprises of five steps starting with defining the target population of the study (Malhotra, 2010). Following this, the sampling frame, sampling technique and sample size are determined. The fifth step of the sampling design is execution of the process detailed in the four previous steps (Malhotra, 2010). Thus, this section will detail the steps of the sampling design, beginning with defining the target population of the study and then describing the sampling frame, sampling technique and sample size used as the sampling method.

4.3.1 The Target Population

The target population is the collection of elements or objects that possess the data sought by the researcher and about which inferences are to be made (Malhotra, 2010). Appropriately defining the target population is crucial for a research study as inaccurate definitions of the target population may lead data being collected from the wrong sample of the population (Zikmund & Babin, 2010). The information collected will thus be inaccurate for the research study and may result in research that cannot address the research problem or provides misleading information.

The target population for this study were players of online social games which have IAP functionality. The players of online games have diverse demographics in terms of age, gender and nationality (Cole & Griffiths, 2007) and, while these are interesting areas of analysis, they are not crucial to the research requirements of this study. Thus, the target population had no demographic requirements other than respondents needing to be players of games with IAP functionality. While other demographic elements were not required, previous literature does indicate that many players of online games tend to be younger (Voikunsky *et al*., 2005; Cole & Griffiths, 2007; Yee, 2007). This was factored in when selecting a sample of convenience elements (Malhotra, 2010) in the sampling approach employed, which is detailed in the section that follows.

Furthermore, the study also focuses only on OPI and not purchase behaviour. Thus, the target population of this study were players of online games with IAP functionality but did not need to be paying players. This is because only the purchase intentions of players are being measure, not their purchase behaviours. The games played by respondents should require an online connection to play and allow players to make IAPs during the course of gameplay. The games also had to have IAP functionality that adds to the competitive nature of gameplay. The target population for this study therefore, had to be players of games like World of Warcraft, Star Wars: The Old Republic, The Elder Scrolls: Online, Wakfu, Tera: Fate of Arun or similar. Filter questions were included in the study questionnaire to ensure that the correct target population were selected as respondents. The details of the filter questions are discussed in section 4.4.1 below.

4.3.2 Sampling Approach

The sampling approach details the sampling frame, sampling techniques and sample size of a study (Malhotra, 2010). The sampling frame is a representation of the elements of the target population and includes a set of characteristics that assist in identifying the target population (Malhotra, 2010). The sampling frame for this study included the list of staff and students on the UCT emailing list and the researchers Facebook friends list, both at the time of data collection.

The sampling frames included elements that did not belong to the target population and therefore, led to sampling frame error (Wyner, 2007). To control for sampling

frame error, this study used filter questions in the questionnaire to remove elements that did not belong to the target population (Couper, 2000).

The next step in the sampling design is to select a sampling technique. Researchers can adopt one of two sampling techniques in research studies: probability sampling and non-probability sampling. With probability sampling, each element in a population is known and it is possible to specify the probability of selecting each sample of a given size (Malhotra, 2010; Zikmund & Babin, 2010). Probability sampling requires a very specific definition of the target population and sampling frame before it can be employed in a study. Thus, it is possible to make statistical projections about the population form the sample drawn.

Non-probability sampling relies on the personal judgement of the researcher to select sample elements and thus it is not possible to determine the probability of selecting elements for inclusion in the sample (Malhotra, 2010; Zikmund & Babin, 2010). Non-probability sampling, therefore, does not require the use of a well-defined sampling frame. This study made use of sampling frames that were not well specified to the specific elements of the target population. Furthermore, the target population is very broad and each element of the population has varied elements in addition to being a player of online games. Therefore, this study made use of non-probability sampling.

There are four types of non-probability sampling available to researchers: Convenience Sampling, Judgement Sampling, Quota Sampling and Snowball Sampling (Malhotra, 2010). This study made use of Convenience sampling. When employing the convenience sampling technique, the selection of the sampling unit is left primarily to the researcher such that the researcher attempts to attain a sample of 'convenient' elements (Malhotra, 2010). Extant literature on online gaming reveals that the majority of MMO game players are between the ages of 18-30 years old, which is the general age of university students (Voikunsky *et al*., 2005; Cole & Griffiths, 2007; Yee, 2007). This age group also forms a large user base for the online social media platform, Facebook (Huang, 2012; Chang *et al*., 2015). Therefore, the researcher chose to use the UCT emailing list and Facebook as convenient elements for distributing the questionnaire link, both of which have majority of younger respondents. In the event that the UCT emailing list and Facebook failed to yield a suitable number of respondents, with permission, the survey would be distributed on MMO gaming forums (Cole & Griffiths, 2007).

When deciding on a sampling technique it is also necessary for the researcher to decide sampling with replacement or without replacement (Zikmund & Babin, 2010). This requires deciding whether an element may be included in a sample more than once. The decision is based on the research design. For example, in cross sectional descriptive research design, information is gathered from a sample only once, and would therefore make use of sampling without replacement. In longitudinal descriptive research design, information is gathered from a sample repeatedly over time and therefore would make use of sampling with replacement. This study only required

information to be gathered from the sample once and thus made use of sampling without replacement.

The final step of the sampling method is to determine the sample size, which refers to deciding on the number of elements to include in the study (Malhotra, 2010). The minimum sample size recommended for problem solving research is 200 respondents (Malhotra, 2010). Previous studies conducting similar research using the S-O-R model made use of samples of 200 respondents (Mathwick & Rigdon, 2004; Huang, 2012). Thus the minimum sample size required for this study was 200 respondents.

In summary, this study made use of non-probability sampling, namely Convenience sampling, with a minimum sample size of 200 respondents. Following this section, the measurement instrument used in the study is discussed.

4.4 MEASUREMENT AND SCALING

Measurement refers to assigning of numbers or symbols to the characteristics of objects based on pre-specified rules while scaling refers to the creation of a continuum upon which measured objects are located (Malhotra, 2010). Measurement and scaling in marketing research refers to designing a measurement instrument for the collection of the necessary information needed in the study as well as designing the measurement scales used within the measurement instrument (Zikmund & Babin, 2010). This section will discuss the measurement instrument used in the study, as well as the measurement scales used in the measurement instrument.

4.4.1 Measurement Instrument

The measurement instrument or measurement tool refers to the set of guidelines and questions used for recording answers when obtaining primary data in a research study (Kimberlin & Winterstein, 2008; Malhotra, 2010). The survey method of research makes use of a questionnaire for obtaining data for research. This study made use of an online questionnaire to collect primary data. As the research conducted was conclusive, the questionnaire was designed using structured questions with predetermined options for the respondent to select from. Using a structured questionnaire with predetermined options makes it easier for respondents to complete the questionnaire and can reduce interviewer bias (Shiu *et al*., 2009).

The questionnaire was the only measurement instrument used in this study, as the data collection process did not require the use of measurement aids or offer a reward for participation in the study.

The questionnaire was constructed on the online survey platform, Qualtrics, as it addressed the needs of the research. The questionnaire began with a short introduction detailing the purpose of the study, the official approval to conduct research and the instructions for respondents to follow. The sampling frame used in the study contained elements with characteristics outside of those required for the study. The

questionnaire addressed this sampling frame error by introducing filter questions before the asking for the required information (Cooper, 2000, Wyner, 2007).

The filter questions required respondents to indicate whether they play online games with IAP functionality and if so, which games they play. The purpose of the filter questions was to remove respondents who do not play online games with IAP functionality, and to assess which games they do play in order to verify whether those games do indeed have IAP functionality.

Following the filter questions, respondents were asked to indicate the average number of hours they spend playing online games each week. This information was required for further insight into player activity as extant literature indicates varied average playing hours (Krotoski, 2004; Cole & Griffiths, 2007; Yee, 2007).

Following this, the questionnaire introduced the measurement items for this study. The questionnaire made use of a Likert-Scale Type approach, similar to previous studies in online gaming (Mathwick & Rigdon, 2004; Lee, 2009; Huang, 2012; Gareth, 2013;). These studies mainly employed the use of 5-point and 7-point Likert-Type Scales. This study makes use of 5-point Likert-Type Scales (Huang, 2012). The introduction of Skill and Challenge into the S-O-R model for online gaming requires the use of 9-point Likert scales (Noval *et al*., 2009). The items follow a chronological order, starting with the 5-point items and ending with the 9-point items.

Lastly, following the measurement items of the study, the questionnaire introduces 3 demographic questions, asking respondents their age, gender and nationality (Cole & Griffiths, 2007). The full questionnaire can be observed in Appendix A.

In this study, the order of questions and the use of both 5-point and 9-point Likert scales was in order to account for the possibility of Common Method Variance (CMV). CMV is variance that is attributable to the measurement method rather than to the constructs the measures represent and is a cause for concern when data is collected using a survey method (Podsakoff, MacKenzie, Lee & Podsakoff, 2003; Chang, van Witteloostuijn & Eden, 2010). The presence of CMV may inflate or deflate the correlations between variables thus altering size of relationships between variables and subsequently leading to misleading results (Fuller, Simmering, Atinc, Atinc & Babin, 2015). In order to control for the possibility of CMV, the questionnaire was designed in a specific order and used scales with differing measurement points, as detailed in this section.

4.4.2 Scaling

This study developed a conceptual model for the study of OPI in online gaming based on the S-O-R model for online social media (Huang, 2012). As such, this study made use of the established scales used in the S-O-R model for online social media and adapted them for use in the study of online gaming. Additionally, two new constructs relevant to online gaming were introduced, Skill and Challenge (Mathwick & Rigdon, 2004). The scales for these constructs were tested in a study by Novak *et al*. (2009)

for the analysis of flow. The Skill and Challenge scales were thus adapted for use in the study of online gaming. The demographic questions used in this study were developed based on previous studies (Krotoski, 2004; Cole & Griffiths, 2007; Yee, 2007).

The scales for each construct used in the conceptual model are summarized in Table 4.2 below. The table also includes the number of items in each scale, the reliability of each scale, and the source(s) of scales.

TABLE 4.2: MEASUREMENT SCALES, ITEMS AND RELIABILITY USED IN THE STUDY

	Scale	**Items**	**Question**	**Reliability**	**Source**
Active Control	5-point Likert	3	4 to 6	0.948	Jiang *et al*. (2000)
Reciprocal Communication	5-point Likert	3	7 to 9	0.914	Jiang *et al*. (2000)
Social Identity	5-point Likert	3	10 to 12	0.956	Yujong (2008)
Skill	9-point Likert	6	25 to 30	0.864	Novak *et al*. (2000)
Challenge	9-point Likert	6	31 to 36	0.876	Novak *et al*. (2000)
Affective Involvement	5-point Likert	3	13 to 15	0.943	Zaichkowsky (1994)
Cognitive Involvement	5-point Likert	3	16 to 18	0.908	Zaichkowsky (1994)
Flow	5-point Likert	3	19 to 21	0.954	Moon & Kim (2001); Lu, Zhou & Wang (2008)
Online Purchase Intent	5-point Likert	3	22 to 24	0.958	Li, Daugherty & Biocca (2002); Wu & Wang (2005).

The scales for *Active Control* and *Reciprocal Communication* were developed by Jiang *et al*. (2000) and make use of a 5-point Likert type scale anchored with 1=Strongly Disagree and 5=Strongly Agree. The scale for *Social Identity* was developed by Yunjong (2008) and made use of a -point Likert type scale anchored with 1=Strongly Disagree and 5=Strongly Agree. The scales for *Skill* and *Challenge* were developed by Novak *et al*. (2000) and made use of a 9-point Likert type scale anchored with 1=Strongly Disagree and 9=Strongly Agree.

The scale for *Flow* was developed from studies by Moon and Kim (2001), and Lu, Zhou and Wang (2008). It made use of a 5-point Likert type scale anchored with 1=Strongly Disagree and 5=Strongly Agree. The scales for *Cognitive Involvement* and

Affective Involvement were developed by Zaichowsky (1994) and made use of a 5-point Likert type scale anchored with 1=Strongly Disagree and 5=Strongly Agree.

The scale for *Online Purchase Intent* was developed from studies by Li *et al*. (2002), and Wu and Wang (2005). It made use of a 5-point Likert type scale anchored with 1=Strongly Disagree and 5=Strongly Agree.

The first filter question in the questionnaire required a yes or no answer. The second filter question used, allowed respondents to select a predetermined answer or select the option 'other', and specify their response. The first demographic question asked how many hours respondents played on average per week and provided predetermined options to select. The second demographic question asked respondents their age and left space for response. The third demographic question asked respondents their gender and provided options for male or female. The last demographic question, and final question of the questionnaire, asked respondents their nationality, providing predetermined options to select as well as an option for 'other' and a space to specify the response.

4.5 DATA COLLECTION

The research proposal and questionnaire for this study was approved by the UCT Commerce Faculty Ethics Committee and permission was granted to collect data via the electronic survey method. To acquire a suitable number of respondents both email and internet interviews were used. In order to make use of the UCT mailing lists, permission was granted by the UCT Director of Student Affairs (DSA) to allow the use of students as respondents in the study. The documentation for Ethics Approval and DSA Approval can be observed in Appendix B and Appendix C respectively.

The questionnaire was administered through the online survey platform, Qualtrics. The Qualtrics survey link was distributed by email through the University of Cape Town (UCT) mailing list and the social media platform, Facebook. If the UCT emailing lists and Facebook failed to yield a suitable number of respondents, with permission, the survey would be distributed on MMO gaming forums (Cole & Griffiths, 2007).

Once the data for the study was obtained, the data was downloaded into a single document then cleaned and coded for use in statistical analysis. The statistical analysis methods used in this study are detailed in the sections to follow.

4.6 DATA ANALYSIS

The data collected in this study was coded for use in two statistical software programs. For the analysis of descriptive statistics, Statistical Package for the Social Sciences (SPSS) was used. For the analysis of the conceptual model, thus the inferential statistics, SmartPLS (Ringle *et al*., 2015) was used. This section thus details the statistical analysis employed in this study, starting with descriptive statistics and followed by inferential statistics. Additionally, the reasons for using Structural Equation

Modelling, specifically Partial Least Squares Structural Equation Modelling, are discussed in this section.

4.6.1 Descriptive Statistics

In quantitative research, descriptive statistics are used to describe the sample in order to determine how it reflects the target population (Bordens & Abbot, 2002). Descriptive statistics condense the data obtained in data collection and allow the researcher to summarise the information in order to decipher any underlying meaning (Shiu *et al.*, 2009). Malhotra (2010) describes three types of measures used to summarise data and draw meaning: measures of location, measures of variability and measures of shape.

Measures of location are also called measures of central tendency and are used to describe the centre of the distribution. There are three measures of central tendency, the mean, median and mode (Malhotra, 2010). The mean measures the average of all elements in a set, the median measures the value in the middle of a set and the mode measures the value that occurs most frequently (Jackson, 2006). The mean is the most commonly used measure of central tendency and was used in this study to analyse the data.

Measures of variability mostly used to indicate the dispersion or spread of data of a distribution are variance and standard deviation (Jackson, 2006; Malhotra, 2010). Variance measures the mean squared deviation from the mean, or more simply, how the data points are spread around the mean (Jackson, 2006). The standard deviation is the square root of the variance and it expresses by how much the members of a group differ from the mean value for the group (Bland & Altman, 1996). This study made use of standard deviation in data analysis.

Measures of shape assess the shape of the distribution and has two measures: Skewness and Kurtosis. The Skewness measures the symmetry of a distribution about the mean while the Kurtosis measures the relative peakedness or flatness of the curve defined by the frequency distribution (Malhotra, 2010). Both Skewness and Kurtosis can be used to assess the normality of a distribution. However, this study made use of PLS-SEM to analyse the data, which also allows for the analyses of non-parametric data (Hubona, 2010). Thus, it was not necessary to test for the normality of data in this study.

The descriptive statistics mentioned above was all analysed using the statistical software SPSS. Where scales comprised of more than one item, the scale items were summated before analysis took place. Table 4.3 is a summary of the descriptive statistics that were used during analysis in this study.

TABLE 4.3: DESCRIPTIVE STATISTICS USED IN THE STUDY

	Number of Items	Summated Scale	Descriptive Statistics
Active Control	3	Yes	Mean, Standard Deviation
Reciprocal Communication	3	Yes	Mean, Standard Deviation
Social Identity	3	Yes	Mean, Standard Deviation
Skill	6	Yes	Mean, Standard Deviation
Challenge	6	Yes	Mean, Standard Deviation
Flow	3	Yes	Mean, Standard Deviation
Cognitive Involvement	3	Yes	Mean, Standard Deviation
Affective Involvement	3	Yes	Mean, Standard Deviation
Online Purchase Intention	3	Yes	Mean, Standard Deviation
Average Hours Played	1	No	Frequency
Age	1	No	Frequency, Mean
Gender	1	No	Frequency
Nationality	1	No	Frequency

The results of the above mentioned descriptive statistics can be found in the following chapter, Chapter 5, and the discussion of the results can be found in Chapter 6. The descriptive statistics were carried out before the inferential statistics, which are detailed in the following section.

4.6.2 Inferential Statistics

Inferential statistics are used to reach conclusions that extend beyond the immediate data and to make inferences from the data to more general conditions (Trochim, 2006). It is the process of generalizing the sample results to the population (Malhotra, 2010) and comprises of many different statistical techniques. The inferential statistical technique used to analyse the data in the study was Structural Equation Modelling (SEM). This technique was chosen for use in this study, as the study makes use of a conceptual model for analysis. The SEM software used in this study was SmartPLS (Ringle *et al*., 2015).

This section of the methodology discusses SEM and the specific form of SEM used in this study, Partial Least Squares Structural Equation Modelling (PLS-SEM).

4.6.2.1 Structural Equation Modelling

Structural Equation Modelling (SEM) is a multivariate statistical analysis technique used for estimating a series of dependent relationships among a set of constructs represented by multiple measured variables and latent (unobservable) variables, and incorporated into an integrated model (Malhotra, 2010). As a multivariate statistical technique, SEM allows for both the measurement of variables in a conceptual model as well as assessing the degree of the relationships between those variables (Hair *et al*., 2014). Simply put, SEM allows researchers to simultaneously evaluate the relationships between variables in conceptual models and thus gain an understanding of the nature of those relationships.

SEM as a statistical analysis method has been growing in popularity in the fields of psychology and marketing (Hair *et al*., 2014; Savalei & Bentler, 2006). SEM has a number of benefits over other multivariate statistical techniques such as factor analysis, discriminant analysis and multiple regression (Chin, 1998). SEM gives researchers greater flexibility with regards to the interplay between theory and data (Chin, 1998). The greater flexibility allows researchers to model relationships among multiple predictor and criterion variables, construct unobservable latent variables, model errors in measurement for observed variables, and statistically test theoretical and measurement assumptions against empirical data (Chin, 1998). SEM is thus valued as a confirmatory analysis method, giving researchers a comprehensive statistical tool for assessing and modifying statistical models (Anderson & Gerbing, 1988), and is especially appropriate for theory testing even when an experiment is not possible (Savalei & Bentler, 2006).

SEM combines statistical elements from both factor analysis and multiple regression (Malhotra, 2010) and can be thought of as the analysis of two conceptually distinct models (Anderson & Gerbing, 1982). The first model, known as the measurement model, incorporates elements of factor analysis and internal reliability analysis (Anderson & Gerbing, 1988). The second model, known as the structural model, incorporates elements of multiple regression (Anderson & Gerbing, 1988).

There are two different approaches to SEM; namely, Covariance-based Structural Equation Modelling (CB-SEM) and Partial Least Squares Structural Equation Modelling (PLS-SEM). The differences are summarized in Table 4.4.

As shown in Table 4.4, there are a number of differences between the PLS-SEM and CB-SEM approaches. The differences in approaches have practical implications for data analysis and each approach thus has specific requirements before data analysis can take place. PLS-SEM is predictor orientated as opposed CB-SEM which is theory oriented, and is thus more suited to predicting behaviours (Hubona, 2010). PLS-SEM is also variance based as opposed to covariance based allowing for the use of more than two constructs and implying that a change in one construct may influence other constructs in a model (Hubona, 2010). PLS-SEM assumes that data is non-parametric,

thus allowing the use of data that is not normally distributed, while CB-SEM assumes that data is parametric, thus requiring the use of normally distributed data. PLS-SEM can be modelled either formatively or reflectively, whereas CB-SEM can only be modelled reflectively (Chin, 1998; Hubona, 2010). This allows PLS-SEM to have optimal prediction accuracy even for complex models (Chin, 1998). Lastly, PLS-SEM allows for the use of smaller sample sizes whereas CB-SEM requires a minimum sample size of 200 respondents (Wong, 2013).

TABLE 4.4: SUMMARY COMPARISON OF PLS-SEM AND CB-SEM APPROACHES

Basis of Comparison	**PLS-SEM**	**CB-SEM**
Objective:	Prediction-oriented	Theory-oriented: Parameter oriented
Approach:	Variance-based	Covariance-based
Assumptions:	Predictor-specific (non-parametric)	Multivariate normal distribution and independent observations (parametric)
Relationship between a latent variable and its measures:	Can be modelled in either formative or reflective mode	Typically only reflective indicators
Implications:	Optimal for prediction accuracy	Optimal for parameter accuracy
Model complexity:	Large complexity (e.g. 100 constructs, 1000 indicators)	Small to moderate complexity (e.g. <100 indicators)
Sample size:	Power analysis based on the portion of the model with largest number of predictors. Recommendations for minimum observations range from 30 to 100 cases.	Ideally based on power analysis of specific model. Recommendations for the minimum number of observations range from 200 to 800.

SOURCE: Hubona (2010).

This study used PLS-SEM approach for three reasons. Firstly, this study attempted to predict the online purchase behaviour of the players of online games with IAP functionality. Thus a PLS-SEM approach is suitable as it is predictor orientated. Secondly, the study made use of a conceptual model with 9 constructs and 33 indictors. PLS-SEM, which is variance based, allows for the use of more than 2 constructs. Third, this study made use of a sample of 212 observations. When using multivariate statistical techniques, a larger sample size is preferred (Malhotra, 2010). While the sample for this study met the minimum required sample for CB-SEM, PLS-

SEM is a preferred approach as the sample would be considered a large sample for the PLS-SEM approach.

The following section discusses how the PLS-SEM method was applied to the statistical analysis of this study using SmartPLS software (Ringle *et al*., 2015).

4.6.2.2 PLS-SEM

As previously mentioned, SEM can be thought of as the analysis of two conceptually distinct models (Anderson & Gerbing, 1982). These models are known as the measurement and structural model (Savalei & Bentler, 2006). The PLS-SEM approach analyses the measurement model before the structural model (Wong, 2013; Hair *et al*., 2014). The measurement model analysis is used to determine the reliability and validity of the items in a model (Anderson & Gerbing, 1982; Savalei & Bentler, 2006). The structural model analyses the model fit, the relationships between constructs and allows for the testing of the stated hypotheses (Anderson & Gerbing, 1982; Savalei & Bentler, 2006).

The measurement model begins with the analysis of item reliability. Reliability first requires the analysis of internal consistency followed by the analysis of indicator reliability (Hubona, 2010; Wong, 2013). Internal consistency reliability has two criterion that need to be checked: the Cronbach's Alpha and Composite Reliability. The Cronbach's Alpha is a measure of the internal consistency reliability of the measurement scales used based on the indicator inter-correlations (Jackson, 2006; Malhotra, 2010). Measurement scales are considered to be reliable if the Cronbach's Alpha is 0.7 or greater (Jackson, 2006; Wong, 2013). Malhotra (2010) also deems scores of 0.6 or greater to be reliable The Composite Reliability is a measure of the strength or weakness of each composite. The Composite Reliability is considered strong if it loads greater than 0.7 for new models or 0.8 for existing models (Wong, 2013). The Cronbach's Alpha and Composite Reliability are both required for the model to have internal consistency reliability.

Following internal consistency reliability is indicator reliability. Indicator reliability requires checking the loadings of the outer model; these should be greater than 0.7 or, if negative, they should be squared and be greater than 0.5 (Hair *et al*., 2014; Wong, 2013). Both internal consistency reliability and indicator reliability are required for the model to be considered reliable.

The measurement model then requires the analysis of item validity. Validity has two criterion that needs to be checked: the Convergent validity and the Discriminant validity (Wong, 2013). Convergent validity looks at the AVE values and checks whether the item loadings load significantly on the latent constructs. AVE values should be greater than 0.5 for convergent validity (Wong, 2013; Hair *et al*., 2014). Discriminant validity looks at whether the square root of the AVE values is greater than the latent variable correlations, and is also called the Fornall-Larcker Criterion (Fornall

& Larcker, 1981). Discriminant validity also requires looking at the cross loadings for each item and checking that the item cross loadings are highest on its assigned construct (Wong, 2013). Both convergent and discriminant validity are required for the model to be considered valid.

Following the measurement model, the structural model needs to be analysed. The structural model first checks the structural fit of the constructs in the model by looking at the R-square (R^2) value (Wong, 2013). The greater the fit of the model, the more suited it is to explaining the constructs and the relationships in the model. The model fit is considered strong with an R^2 of 0.67, the model fit is considered moderate with an R^2 of 0.33, and the model fit is considered weak with an R^2 of 0.19 (Hair *et al*., 2014; Wong, 2013).

The next criterion in the structural model is to determine whether the path values of the model are significant. Path values are considered significant when they are greater than 0.2 or less than -0.2 (Wong, 2013). Additionally, path values closer to +1 or -1 are considered to be strong relationships while path values closer to 0 are considered to be weak relationships (Garson, 2016). The last criterion in the structural model is the effect sizes of the changes made to the model. The effect size is considered weak when the value is between 0.02 and 0.15, it is considered moderate when the value is between 0.15 and 0.35, and is considered strong when the value is greater than 0.35 (Wong, 2013).

Once the measurement model and structural model have been analysed, the overall model and hypotheses can be evaluated. The hypotheses are tested using the path coefficient values and the t-values of the model (Wong, 2013; Hair *et al*., 2014). For the purposes of this study, hypotheses have been tested against a 5% significance level (p=0.05). The outcomes of the hypothesis testing can be used to draw conclusions and make recommendations.

4.7 CONCLUSION

This chapter discusses the methodological foundations of this study and formed a basis from which the data analysis of the gathered data could be discussed. In this regard, the chapter detailed the specifics of the descriptive research designed used in this study as well as the methods used to carry out the research and gather the necessary primary data. It also detailed the measurement instrument used in this study, an online questionnaire, and provided justification for the target population and sample sizes used in the study. Furthermore, the chapter outlined the statistical methods employed in the analysis of the gathered data including a detailed explanation and justification for the use of PLS-SEM software for data analysis. The following chapter of this study discusses the results of the statistical analysis of the gathered data. The next chapter begins with a discussion of the descriptive statistics used on the gathered data followed by the inferential statistics obtained using PLS-SEM software.

CHAPTER FIVE: PRESENTATION AND INTERPRETATION OF RESULTS

5.1 INTRODUCTION

In the previous chapter, the methodology employed in this study was detailed. The research design, method, sampling design and measurement instrument used were all detailed and justified. The data analysis methods used in this study were also detailed and justified. The data analysis method chosen for this study was Structural Equation Modelling (SEM), as this study makes use of a conceptual model to test hypotheses. Furthermore, the chapter differentiated between the Partial Least Squares Structural Equation Modelling (PLS-SEM) approach and the Covariance Based Structural Equation Modelling (CB-SEM) approach based on the characteristics of each. The PLS-SEM approach was selected for this study and also justified in the methodology.

In this chapter, the results of the data analysis performed is detailed. The chapter begins with the conceptual model that was tested, the S-O-R model for Online Gaming, as well as a summary of the hypotheses that were tested. Following this, a brief discussion of data collection is provided, followed by a presentation of the descriptive statistics of the study. Thereafter, the inferential statistics of the study are detailed using the PLS-SEM approach of data analysis. The PLS-SEM approach begins with the analysis of the measurement model, for the evaluation of reliability and validity, and then the analysis of the structural model, for the evaluation of the model fit, path values and effect size. Finally, the hypotheses are tested using the overall model.

5.2 CONCEPTUAL MODEL AND HYPOTHESES

The conceptual model used in this study, the Stimulus-Organism-Response (S-O-R) model for Online Gaming, is introduced and detailed in Chapter 3. The model is introduced again below in Figure 5.1 and also includes the associated hypotheses which were tested in this study.

The following hypotheses were formulated for this study:

H_1: Active Control has a positive influence on Flow.

H_2: Reciprocal Communication has a positive influence on Flow.

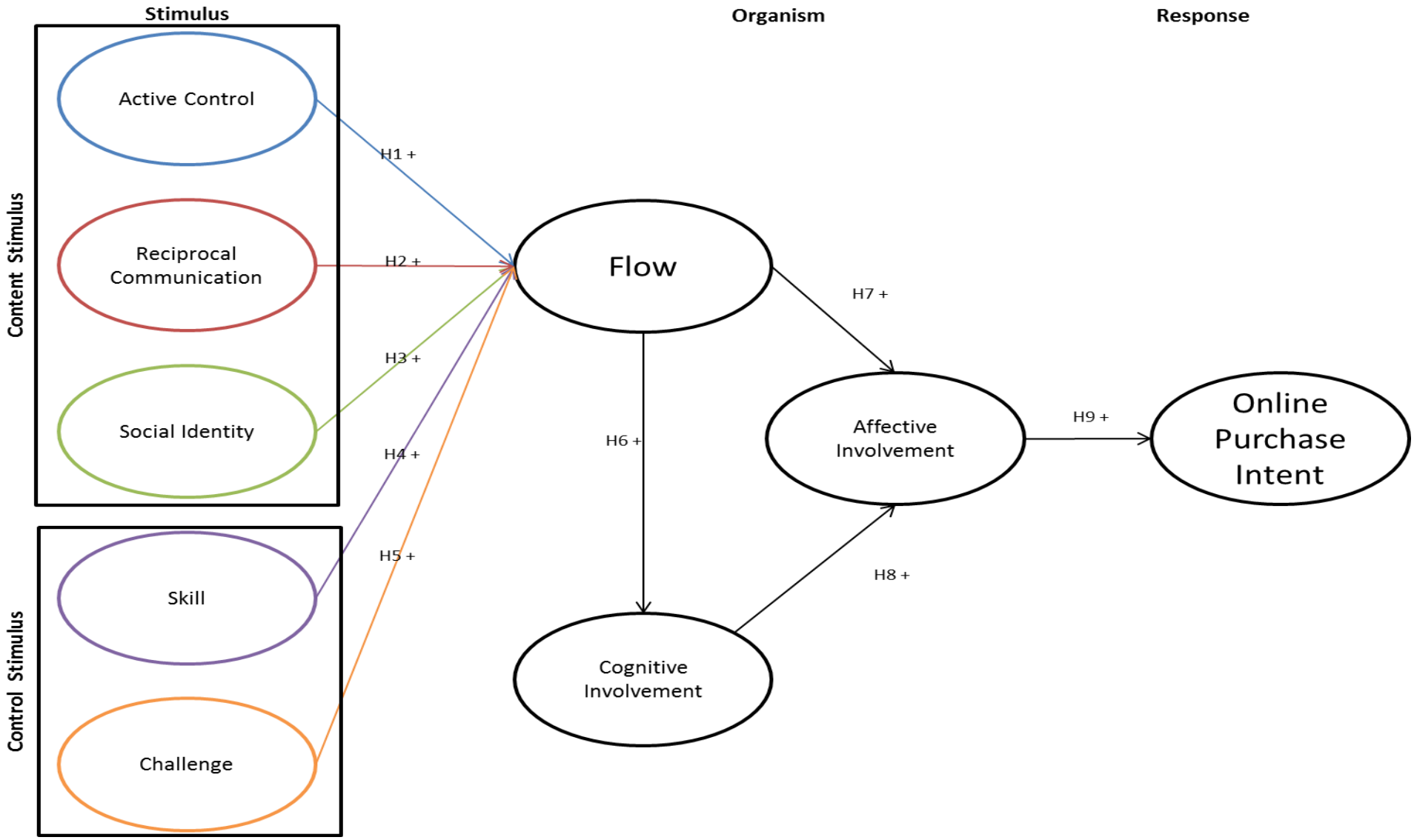
H_3: Social Identity has a positive influence on Flow.

H_4: Skill has a positive influence on Flow.

H_5: Challenge has a positive influence on Flow.

H_6: Flow has a positive influence on Cognitive Involvement.

FIGURE 5.1: THE S-O-R MODEL FOR ONLINE GAMING



SOURCE: Adapted from Huang (2012) and Hoffman & Novak (2009).

H_7: Flow has a positive influence on Affective Involvement.

H_8: Cognitive Involvement has a positive influence on Affective Involvement.

H_9: Affective Involvement has a positive influence on Online Purchase Intention.

The S-O-R model for Online Gaming is adapted from the S-O-R model for SNSs (Huang, 2012), which in turn was developed from the basic S-O-R model. The S-O-R model is an environmental psychology model used to analyse the mediating effect of emotional responses on the relationship between the environment and an individual's behaviour (Mehrabian & Russel, 1980s). The S-O-R model thus postulates that there are three stages an individual progresses through when responding to a stimuli; namely, the Stimulus stage, the Organism stage and the Response stage.

In the S-O-R model for Online gaming, the Stimulus stage of the model uses two sets of stimulus constructs: the Content Stimulus constructs, Active Control, Reciprocal Communication and Social Identity, and the Control Stimulus constructs, Skill and Challenge. The Organism stage of the model presents the constructs of Flow and Involvement, namely Affective Involvement and Cognitive Involvement. The last stage of the S-O-R model, the Response stage, presents the construct Online Purchase Intention (OPI).

The S-O-R model for Online Gaming theorizes that the Stimulus stage constructs Active Control, Reciprocal Communication, Social Identity, Skill, and Challenge have a positive influence on the Organism stage construct, Flow (Novak *et al*., 2000; Mathwick & Rigdon, 2004; Huang, 2012; Hahl, 2014; Narinen, 2014). This led to the formulation of the hypotheses H_1 to H_5. The construct Flow, is shown to have a positive influence on the remaining Organism stage constructs, Affective Involvement and Cognitive Involvement (Hoffman & Novak, 1996; Huang, 2003; Guo & Barnes, 2009; Hoffman & Novak, 2009). This lead to the formulation of hypotheses H_6 and H_7. Furthermore, Cognitive involvement is shown to have a positive influence on Affective Involvement (O'Regan, 2003). This led to the formulation of hypothesis H_8. Lastly, the Response stage construct, OPI, is shown to be positively influenced by Affective Involvement (Sweetser & Wyeth, 2005; Hudlicka, 2008; Huang, 2012). This led to the formulation of the final hypothesis for this study, H_9.

This chapter details the results obtained from the statistical analysis of the S-O-R model for Online Gaming as well as the testing of the above hypotheses. Before the model is examined, a brief description of data collection and fieldwork is give, after which the descriptive statistics pertaining to the sample are reviewed.

5.3 DATA COLLECTION AND FIELDWORK

This study made use of electronic surveys to collect data. The questionnaire was administered using Qualtrics, and the link to the Qualtrics survey was shared on Facebook and through the UCT emailing system. Data collection began on March 10,

2016 when the link to the survey was first shared. The link was shared 3 times on Facebook and only once through the UCT emailing system. The link remained active for 4 weeks, at which point no further responses had been observed for a week prior. At this point, 263 responses had been obtained which was more than the required 200 minimum respondents. Thus, the researcher determined that no further responses were necessary and closed the survey link.

The data was then downloaded from Qualtrics, and cleaned and coded in preparation for statistical analysis. After cleaning the data, the researcher was left with 209 usable responses which were used in the analysis to follow. The 54 respondents removed either did not play games suitable for use in this study or did not suitably complete the questionnaire. The outcome of the statistical analysis used in this research study is detailed in the following sections, starting with descriptive statistics.

5.3 DESCRIPTIVE STATISTICS

This section details the descriptive statistics of the sample, as outlined in section 4.6 of Chapter 4, starting with the analysis of the nominal data and thereafter, the analysis of the interval data. The statistical analysis of all descriptive statistics as conducted using the SPSS statistical software.

5.3.1 Analysis of Nominal Data

The descriptive statistics summarised below pertains to the nominal data collected. This includes the data for average hours played per week (for online games), the age of respondents, the gender of respondents, and the country of residency. The statistics analysed were the frequencies for each nominal variable and the mean for the age variable. The following table summarises the statistical output of the nominal data analysis:

TABLE 5.1: DESCRIPTIVE STATISTICS FOR NOMINAL DATA

	N	Frequency
Average Hours Played (per week)	209	100%
7 hours or less	108	51.7%
7 – 15 hours	52	24.9%
15 – 20 hours	18	8.6%
20 – 25 hours	16	7.7%
25+ hours	15	7.2%
Age	209	100%
18 – 25	172	82.2%
26 – 30	28	13.3%
30 - 35	5	2.5%

36+	4	2%
Gender	209	100%
Male	155	74.1%
Female	53	25.4%
No answer	1	0.5%
Country of Residency	209	100%
United States of America	1	0.5%
United Kingdom	1	0.5%
South Africa	205	98.1%
Other	2	1%

In Table 5.1, N refers to the number of respondents associated with each frequency. Each variable is divided into a number of categories, and the frequency associated with each category is provided in the table. In the measurement instrument, respondents were asked to give their specific age as opposed to selecting an age category. For the ease of analysis, the researcher summarized respondent ages into four categories. Additionally, one respondent did not select a gender identity and as such, has been recorded as 'no answer'.

The sample for this study was majority male (74.1%) which is consistent with previous studies (Griffiths *et al.*, 2004; Cole & Griffiths, 2007). The average age of respondents was 22 years old and the majority of respondents fell into the 18 – 25 age category. This is also consistent with previous studies which found that most Massively Multiplayer Online (MMO) games players are between the ages of 18 – 30 (Voikunsky *et al.*, 2005; Cole & Griffiths, 2007; Yee, 2007).

For the average hours played per week, 51.7% of respondents played online MMO games 7 hours or less per week, while 24.9% of respondents played MMO games for 7 – 15 hours per week. The remaining 23.5% of respondents played more than 15 hours of MMO games per week. Previous studies estimate the average hours played per week to be 23 hours (Cole & Griffiths, 2007; Yee, 2007) but also show that average hours played may differ dependant on the respondent's country of residence (Krotoski, 2004; Cole & Griffiths, 2007). For this study, the majority of respondents (98.1%) are residents of South Africa thus, the average number of hours played may be related to South African players of MMO games only.

Overall, the sample of respondents collected for this study appears to be consistent with those found in previous studies on MMO gaming (Krotoski, 2004; Voikunsky *et al.*, 2005; Cole & Griffiths, 2007; Yee, 2007). The following section of this chapter details the descriptive statistics for the interval data collected in this study.

5.3.2 Analysis of Interval Data

The descriptive statistics summarized in the table below pertains to the interval data collected. The data analysed made use of Likert scales (5-point and 9-point) which are interval in nature (Malhotra, 2010). The scales analysed include Active Control, Reciprocal Communication, Social Identity, Skill, Challenge, Flow, Cognitive Involvement, Affective Involvement, and Online Purchase Intent (OPI). The statistics presented are the means and standard deviations of each variable. The statistics are summarized in the table below:

TABLE 5.2: DESCRIPTIVE STATISTICS FOR INTERVAL DATA

	No. of Items	**Type of Scales**		**N**	**Mean**	**Standard Deviation**
Active Control	3	5		209	4.0	0.89
Reciprocal Communication	3	5		209	3.83	0.99
Social Identity	3	5		209	3.32	1.0
Skill	6	9		209	6.63	1.30
Challenge	6	9		209	5.95	1.91
Flow	3	5		209	4.0	0.79
Cognitive Involvement	3	5		209	3.29	1.21
Affective Involvement	3	5		209	3.79	0.97
Online Purchase Intent	3	5		209	2.66	1.39

In Table 5.2 above, the scale refers to the summated scale of the items for each construct. The type of scale refers to whether the scale was a 5-point Likert scale or a 9-point Likert scale, while N refers to the number of respondents used in the analysis. Each scale is discussed sequentially below, in the order it appears in Table 5.2. The items related to each scale can be found in Appendix A.

Active control was a 3-item, 5-point Likert scale anchored in 1=Strongly Disagree and 5=Strongly Agree. Active Control is the ability of an individual to choose who they interact with, when to interact and which information to take in when engaging in an online space (Lowry *et al*., 2006). The mean for the summated Active Control scale is 4.0 and the standard deviation is 0.89, indicating that on average, respondents agreed that Active Control is important when playing online games.

Reciprocal Communication was a 3-item, 5-point Likert scale anchored in 1=Strongly Disagree and 5=Strongly Agree. Reciprocal Communication is the ability to communicate between two or more entities (Jiang *et al.*, 2010). The mean for the summated Reciprocal Communication scale is 3.83, indicating that on average, respondents were neutral to the importance of Reciprocal Communication capability in online games. Reciprocal Communication has a standard deviation of 0.99, indicating that the majority of respondents ranged between being neutral to Reciprocal

Communication capabilities and agreeing that it is an important characteristic in online games.

Social Identity was a 3-item, 5-point Likert scale anchored in 1=Strongly Disagree and 5=Strongly Agree. Social Identity can be defined as a player's self-esteem and commitment to online groups, as well as the way they identify with a particular group in terms of the characteristics attributed to that group (Dutton *et al*., 1994; Dholakia & Chiang, 2003; Yujong, 2008; Kwon & Wen, 2009). Social Identity has a mean of 3.32 and a standard deviation of 1.0, indicating that on average, respondents were neutral to the importance of Social Identity in online games.

Skill was a 6-item, 9-point Likert scale anchored in 1=Strongly Disagree and 9=Strongly Agree. Skill can be defined as a consumer's capacity for action (Hoffman & Novak, 1996). In online games, Skill would refer to a player's ease of use of game controls as well as the ability to complete the tasks set during gameplay. The mean for Skill is 6.63 with a standard deviation of 1.30. This indicates that on average, respondents slightly agreed that player Skill is important when playing online games, and that most respondents ranged between being neutral and slightly agreeing that player Skill is important in playing online games.

Challenge was a 6-item, 9-point Likert scale anchored in 1=Strongly Disagree and 9=Strongly Agree. Challenge can be defined as the opportunities for action available to the consumer in a CME (Hoffman & Novak, 1996). In online games specifically, challenge would refer to the tasks of gameplay and the level of difficulty they are set at, as well as the game controls and how easy they are to use. The mean for Challenge is 5.95 with a standard deviation of 1.91, indicating that on average, most respondents were neutral to the importance of challenging tasks in online games.

Flow was a 3-item, 5-point Likert scale anchored in 1=Strongly Disagree and 5=Strongly Agree. Flow can be thought of as a holistic sensation felt when acting with total involvement (Csikszentmihalyi, 1975). The mean for Flow is 4.0 indicating that on average, respondents agreed that reaching a state of Flow is important when playing online games. Flow has a standard deviation of 0.79 indicating that most respondents tend to agree that reaching a state of Flow is important to playing online games.

Cognitive Involvement was a 3-item, 5-point Likert scale anchored in 1=Strongly Disagree and 5=Strongly Agree. Cognitive Involvement can be seen as the cognitive response of a consumer when triggered by a stimulus (Celsi & Olsen, 1988; Putrevu & Lord, 1994). Cognitive Involvement has mean of 3.29 and a standard deviation of 1.21, indicating that most respondents were neutral with regards to importance of thinking about the use of virtual goods in online games.

Affective Involvement was a 3-item, 5-point Likert scale anchored in 1=Strongly Disagree and 5=Strongly Agree. Affective Involvement can be seen as the emotional response triggered in a consumer by a stimulus (Celsi & Olsen, 1988; Putrevu & Lord,

1994). The mean for Affective Involvement is 3.79, indicating that on average, respondents leant towards slightly agreeing that using virtual goods can be emotionally stimulating. Affective involvement has a standard deviation of 0.97, indicating that most respondents ranged between being neutral and agreeing that using virtual goods can be emotionally stimulating.

The final construct is *Online Purchase Intent (OPI)*, which was a 3-item, 5-point Likert scale anchored in 1=Strongly Disagree and 5=Strongly Agree. OPI is a customer's willingness to purchase products or services through a website (Chen *et al*., 2010). OPI has a mean of 2.66, indicating that on average, respondents would not agree to purchases of virtual goods in online games. OPI has a standard deviation of 1.39, indicating that most respondents ranged between being neutral towards purchasing virtual goods and not agreeing to purchase virtual goods in online games.

The descriptive statistics analysed above are useful for describing the respondents in the sample as well as indicating the average responses of respondents pertaining to the constructs used in the S-O-R model for Online Gaming. The means obtained in this study differs to those found in previous studies (Hoffman & Novak, 2009; Huang, 2012). However, previous studies focused on online social media as opposed to online gaming, which may therefore account for the differences in means. In the section to follow, the inferential statistics analysed in this study are detailed.

5.4 INFERENTIAL STATISTICS USING THE PLS-SEM APPROACH

This section discusses the inferential statistical analysis for this study. The inferential statistical analysis was conducted with the PLS-SEM approach of structural equation modelling, using the SmartPLS software package (Ringle *et al*., 2015). In applying the PLS-SEM approach, this section first details the measurement model specifically detailing the analysis of the reliability and validity of the model. Thereafter, the analysis of the structural model is detailed followed by the analysis of the overall model and hypotheses.

To analyse each model, SmartPLS software was used to run a bootstrapping and PLS algorithm on the conceptual model. The bootstrapping output provides the path values, t-values and significance values required to test the model hypotheses. The PLS algorithm provides the remaining statistical output used to analyse the measurement and structural models.

5.4.1 The Measurement Model

When applying the PLS-SEM approach of structural equation modelling, the measurement model is used to assess the reliability and validity of the items in the model. The reliability required the assessment of internal consistency and indicator reliability. Indicator reliability required checking the Cronbach's Alpha scores as well as the Composite reliability scores. Indicator reliability required checking the loadings found in the outer model of the PLS algorithm. Validity required the assessment of

Convergent validity and Discriminant validity. Convergent validity required checking the Average Variance Extracted (AVE) scores. Discriminant validity required the checking of Fornall-Larcker criterion and the cross loadings.

The assessment of reliability and validity is detailed in the sections to follow.

5.4.1.1 Reliability

The reliability of the measurement model first assesses internal consistency. The internal consistency measures, the Cronbach's Alpha and the Composite Reliability are summarised in Table 5.4 below:

TABLE 5.3: INTERNAL CONSISTENCY RELIABILITY MEASURES

Variable	Cronbach's Alpha	Composite Reliability
Active Control	0.63	0.84
Reciprocal Communication	0.77	0.87
Social Identity	0.83	0.90
Skill	0.81	0.86
Challenge	0.92	0.93
Flow	0.66	0.81
Cognitive Involvement	0.89	0.93
Affective Involvement	0.88	0.92
Online Purchase Intent	0.96	0.97

The Cronbach's Alpha evaluates whether the construct items measure the associated construct (Malhotra, 2010) and is considered reliable if the value is between 0.6 and 0.7 or higher (Jackson, 2006; Malhotra, 2010). All Cronbach's Alpha values were greater than 0.6 with the exception of Active Control which had a value of 0.59. The Alpha-if-deleted statistics were checked and the score could be improved to 0.63 by removing Item 1 from the Active Control scale. Item 1 was removed from the Active Control scale and the PLS algorithm was run again resulting in all Cronbach's Alpha scores being greater than 0.6. The Active Control scale was thus measured using only two items. Using scales with a smaller number of items is not always optimal as it may impact on the precision of data measurement (Kimberlin & Winterstein, 2008).

The Composite Reliability is the measure of the strength or weakness of each composite and requires the score to be greater than 0.7 for new models or 0.8 for existing models (Wong, 2013). All Composite Reliability scores for the model are greater than 0.8. With both suitable Cronbach's Alpha and Composite Reliability scores, it could be concluded that the model had internal consistency reliability.

In order to assess indicator reliability, the loadings in the outer model of the PLS algorithm were checked. The loadings can be found in Appendix D. In order to obtain indicator reliability, the loadings for each item need to be greater than 0.7 for positive

scores, or greater than 0.5 for the square root of the score if the score is negative (Wong, 2013; Hair *et al*., 2014). All loadings found in the outer model were positive and thus no loadings needed to be squared. All loading scores were found to be greater than 0.7 with the exception of Skill items 3 and 4, which had scores of 0.41 and 0.62 respectively. However, Skill was kept in the model as four other items has loadings greater than 0.7 and had a suitable Cronbach's Alpha and Composite Reliability score (Wong, 2013). Thus, the model was also found to have suitable indicator reliability.

5.4.1.2 Validity

The validity of the measurement model first assesses Convergent validity by checking the AVE scores. AVE scores are found to be suitable if they are greater than 0.5 (Wong, 2013; Hair *et al*., 2014). The AVE scores are summarized below:

TABLE 5.4: AVE SCORES FOR CONVERGENT VALIDITY

Variable	AVE
Active Control	0.72
Reciprocal Communication	0.69
Social Identity	0.75
Skill	0.51
Challenge	0.70
Flow	0.59
Cognitive Involvement	0.81
Affective Involvement	0.80
Online Purchase Intent	0.92

As can be seen in Table 5.5, all AVE scores for the model were greater than 0.5 and the model can thus be considered to have convergent validity.

Discriminant validity is assessed using the Fornall-Larcker criterion, where the square root of the AVE for a construct should be greater than the constructs correlations with other constructs (Fornall & Larcker, 1981). The Fornall-Larcker criterion output can be found in Appendix E. In Appendix E, it can be observed that all the square roots of the AVE scores (marked in bold) were greater than the correlation scores thus meeting the Fornall-Larcker criterion. Discriminant validity also required checking the item cross loadings of the PLS algorithm which can be found in Appendix F. The cross loading score for each item needs to be highest for its associated construct in order to be considered valid (Wong, 2013). In Appendix F, it can be observed that the cross loadings for each item is highest for its associated construct (marked in bold). As Fornall-Larcker criterion was met and the cross loadings were deemed suitable, the model can be considered to have discriminant validity.

In assessing the reliability and validity of the measurement model, it was discovered that the model has both internal and indicator reliability, as well as convergent and discriminant validity. The measurement model for the S-O-R model for Online Gaming can thus be considered to be both reliable and valid. Following the analysis of the measurement model was the analysis of the structural model which is detailed in the next section.

5.4.2 The Structural Model

Following the analysis of validity and reliability, the structural model of the PLS-SEM approach was used to assess the fit of the model, and evaluate the path values and effect sizes. The fit of the model was assess by checking the R Square (R^2) values of the endogenous variables in the model. The path values of the model were found in the bootstrapping model, while the effect sizes were found in the f Square values of the PLS algorithm. The R^2 values and the path values can be observed in Figure 5.2 or in the PLS Algorithm Model found in Appendix G.

A R^2 value of 0.67 is considered to be strong, a value of 0.33 is considered to be moderate, and a value of 0.19 is considered to be weak (Wong, 2013; Hair *et al*., 2014). The constructs assessed for fit are Flow, Cognitive Involvement, Affective Involvement and Online Purchase Intent. As can be seen in Figure 5.2, Flow has an R^2 of 29% which indicates a moderate fit. Cognitive Involvement has an R^2 of 2.8% which can be considered a very weak fit. Affective Involvement has an R^2 of 31.4% which indicates a moderate fit. Lastly, Online Purchase Intent has an R^2 of 12.5% which indicates a weak fit. The R^2 values indicate a weak to moderate model fit but the R^2 values cannot be considered in isolation (Chin, 1998). The path values need to be assessed alongside the R^2 values, as the R^2 values hold less power if the path values are significant (Chin, 1998).

The path values of the model are considered to be significant if they are greater than 0.2 or less than -0.2 (Wong, 2013). Additionally, path values closer to +1 or -1 are considered to be strong relationships while path values closer to 0 are considered to be weak relationships (Garson, 2016). The path values can be observed in Figure 5.2 and Table 5.6 below, where significant path values have been bolded.

From Table 5.6, it can be observed that the significant path values are those between Challenge and Flow (0.33), Flow and Affective Involvement (0.29), Cognitive Involvement and Affective Involvement (0.43), and Affective Involvement and Online Purchase Intent (0.35). The constructs with low R^2 values, Cognitive Involvement and Online Purchase intent were thus considered acceptable for inclusion in the model as they had significant path values (Chin, 1998). Additionally, the relationship between Cognitive Involvement and Affective Involvement can be considered to be moderately strong while the remaining relationships can be considered to be moderate to weaker relationships (Garson, 2016).

FIGURE 5.2: THE S-O-R MODEL FOR ONLINE GAMING WITH PATH VALUES AND R^2 VALUES

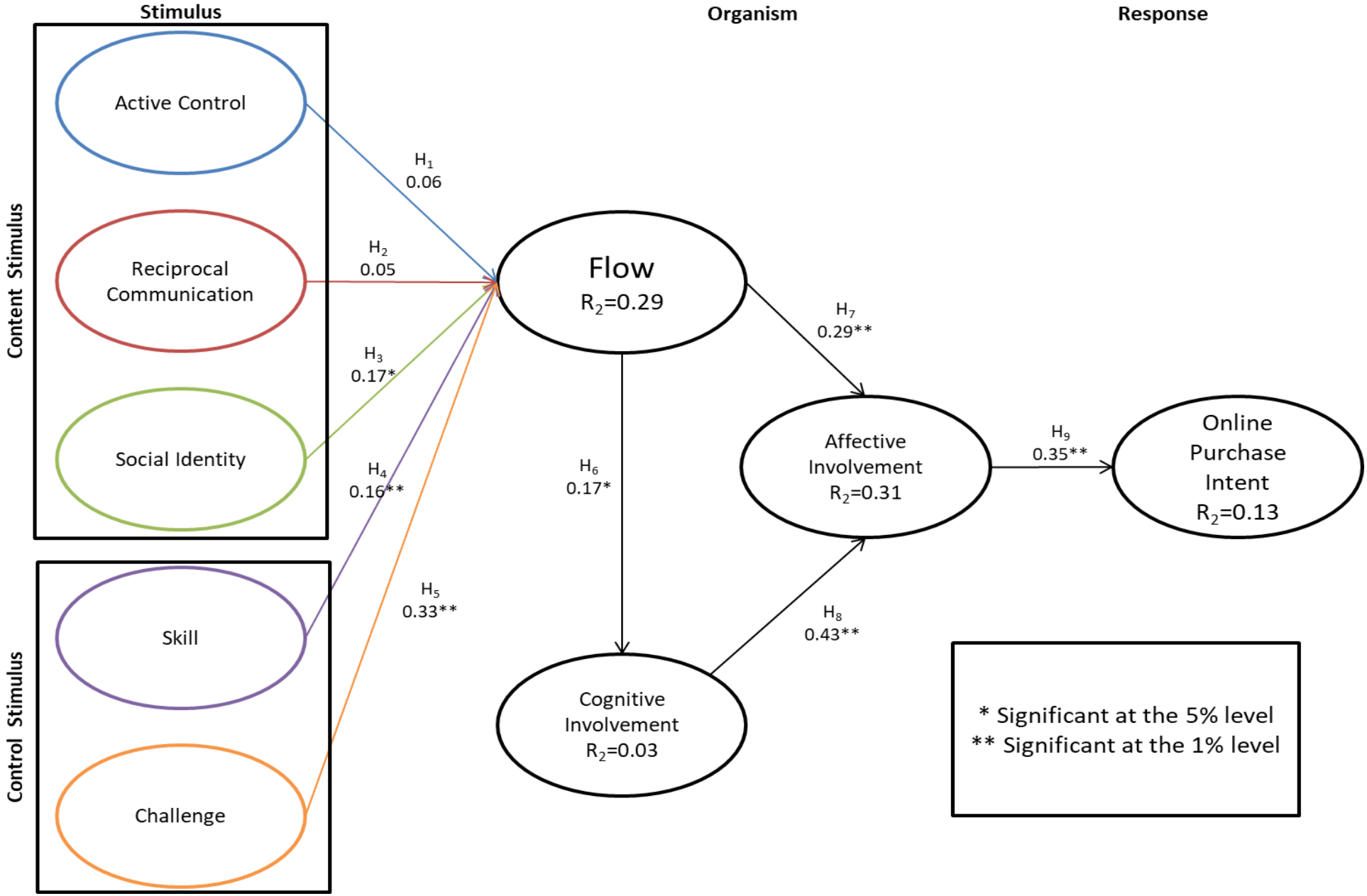


TABLE 5.5: PATH VALUES FOR THE STRUCTURAL MODEL

	ACTIVE CONTROL	AFFECTIVE INVOLVEMENT	CHALLENGE	COGNITIVE INVOLVEMENT	FLOW	ONLINE PURCHASE INTENT	RECIPROCAL COMMUNICATION	SKILL	SOCIAL IDENTITY
ACTIVE CONTROL					0.06				
AFFECTIVE INVOLVEMENT						**0.35**			
CHALLENGE					**0.33**				
COGNITIVE INVOLVEMENT		**0.43**							
FLOW		**0.29**		0.17					
ONLINE PURCHASE INTENT									
RECIPROCAL COMMUNICATION					0.05				
SKILL					0.16				
SOCIAL IDENTITY					0.17				

The final criterion to be assessed in the structural model were the effect sizes of the additions and adaptations made to the original model. There are two additions and three adaptations made to the original model; namely, the inclusion of Skill and Challenge, and the relationships between Flow and Cognitive Involvement, Flow and Affective Involvement, and Cognitive Involvement and Affective Involvement (Hoffman & Novak, 2009; Huang, 2012). The effect size is considered weak when the value is between 0.02 and 0.15, it is considered moderate when the value is between 0.15 and 0.35, and is considered strong when the value is greater than 0.35 (Wong, 2013).

The effect size for Skill was 0.03 and the effect size for Challenge was 0.12. Both these values were considered to be weak indicating that their inclusion in the model did not differentiate it much from the original model (Wong, 2013). The effect size for Flow on Cognitive Involvement was 0.03, 0.12 for Flow on Affective Involvement, and 0.26 for Cognitive Involvement on Affective Involvement. While the effect sizes for Flow on Involvement could be considered weak, the effect size for Cognitive Involvement on Affective Involvement could be considered to be moderate thus indicating that this adaption of the model differs from the original model (Wong, 2013).

The assessment of the measurement model and structural model above indicated that the model was stable and did not differ significantly from the original model. The model was also deemed to be reliable and valid, and thus suitable for use as an instrument

to assess the findings of the model (Wong, 2013). The following section of this chapter details the evaluation of the overall model and the study hypotheses.

5.4.3 Overall Model and Hypotheses

In order to assess the overall model and the study hypotheses the bootstrapping output was used to give the path coefficients, the t-values and the test significance values. The output has been summarized in Table 5.7 below:

TABLE 5.6: BOOTSTRAPPING OUTPUT FOR THE OVERALL MODEL AND HYPOTHESES TESTS

Key: (*) significant at the 5% level (**) significant at the 1% level (-) not significant	**Path Coefficient**	**t-value**	**p-value**	**Significance**
ACTIVE CONTROL -> FLOW	0.06	0.72	0.47	-
AFFECTIVE INVOLVEMENT -> ONLINE PURCHASE INTENT	0.35	6.23	0.00	**
CHALLENGE -> FLOW	0.33	4.92	0.00	**
COGNITIVE INVOLVEMENT -> AFFECTIVE INVOLVEMENT	0.43	6.90	0.00	**
FLOW -> AFFECTIVE INVOLVEMENT	0.29	4.42	0.00	**
FLOW -> COGNITIVE INVOLVEMENT	0.17	2.17	0.03	*
RECIPROCAL COMMUNICATION -> FLOW	0.05	0.62	0.53	-
SKILL -> FLOW	0.16	2.69	0.01	**
SOCIAL IDENTITY -> FLOW	0.17	2.12	0.03	*

As previously mentioned, the path coefficients (path values) are considered to be significant if they are greater than 0.2 or less than -0.2 (Wong, 2013). The t-values were tested against a significance level of 5% (p=0.05). The outcomes for each hypothesis were as follows:

- *H_1: Active Control has a positive influence on Flow.*

  The path value for H_1 of 0.06 indicated that there is a positive relationship between Active Control and Flow but that the relationship is not significant. The hypothesis test has a *t-value* of 0.72 and a *p-value* of 0.47. Therefore, the H_0 could not be rejected, indicating that Active Control did not have an influence on Flow.

- *H_2: Reciprocal Communication has a positive influence on Flow.*

  The path value for H_2 of 0.05 indicated that there is a positive relationship between Reciprocal Communication and Flow but that the relationship is not significant. The hypothesis test has a *t-value* of 0.62 and a *p-value* of 0.53. Therefore, the H_0 could not be rejected, indicating that Reciprocal Communication did not have an influence on Flow.

- *H_3: Social Identity has a positive influence on Flow.*

  The path value for H_3 of 0.17 indicated that there is a positive relationship between Social Identity and Flow but that the relationship is not significant. The hypothesis test has *a t-value* of 2.12 and a *p-value* of 0.03. Therefore, the H_0 could be rejected, indicating that Social Identity did have a positive influence on Flow.

- *H_4: Skill has a positive influence on Flow.*

  The path value for H_4 of 0.16 indicated that there is a positive relationship between Skill and Flow but that the relationship is not significant. The hypothesis test has a *t-value* of 2.69 and a *p-value* of 0.01. Therefore, the H_0 could be rejected, indicating that Skill did have a positive influence on Flow.

- *H_5: Challenge has a positive influence on Flow.*

  The path value for H_5 of 0.33 indicated that there is a positive relationship between Challenge and Flow, and that the relationship is significant. The hypothesis test has a *t-value* of 4.92 and a *p-value* of 0.00. Therefore, the H_0 could be rejected, indicating that Challenge did have a positive influence on Flow.

- *H_6: Flow has a positive influence on Cognitive Involvement.*

  The path value for H_6 of 0.17 indicated that there is a positive relationship between Flow and Cognitive Involvement but that the relationship is not significant. The hypothesis test has a *t-value* of 2.17 and a *p-value* of 0.03. Therefore, the H_0 could be rejected, indicating that Flow did have a positive influence on Cognitive Involvement.

- *H_7: Flow has a positive influence on Affective Involvement.*

  The path value for H_7 of 0.29 indicated that there is a positive relationship between Flow and Affective Involvement, and that the relationship is significant. The hypothesis test has a *t-value* of 4.42 and a *p-value* of 0.00. Therefore, the H_0 could be rejected, indicating that Flow did have a positive influence on Affective Involvement.

- *H_8: Cognitive Involvement has a positive influence on Affective Involvement.*

  The path value for H_8 of 0.43 indicated that there is a positive relationship between Cognitive Involvement and Affective Involvement, and that the relationship is significant. The hypothesis test has *a t-value* of 6.90 and a *p-value* of 0.00. Therefore, the H_0 could be rejected, indicating that Cognitive Involvement did have a positive influence on Affective Involvement.

- *H_9: Affective Involvement has a positive influence on Online Purchase Intention.*

  The path value for H_9 of 0.35 indicated that there is a positive relationship between Affective Involvement and Online Purchase Intent, and that the relationship is significant. The hypothesis test has a *t-value* of 6.23 and a *p-value* of 0.00. Therefore, the H_0 could be rejected, indicating that Affective Involvement did have a positive influence on Online Purchase Intention.

Overall, the model was found to be reliable and valid as a measurement instrument through the analysis of the measurement model. Additionally, the model was also found to be structurally sound, through the analysis of R^2 values, path values and effect sizes in the structural model. The testing of hypotheses found that the H_0 for H_1 and H_2 could not be rejected at the 5% significance level and thus those relationships were found to not be statistically significant. The remaining hypotheses from H_3 to H_9, found that the H_0 could be rejected at the 5% significance level, and thus those relationships were found to be statistically significant. The implications of the results detailed in this chapter is discussed in the chapter to follow, Chapter 6.

5.5 CONCLUSION

The purpose of this chapter was to detail the results of the statistical analysis performed on the conceptual model shown in Figure 5.1 and detailed in Chapter 3 of this study. This chapter began with a summary of the conceptual model used in this study and the associated hypotheses. Thereafter, the results of the statistical analysis conducted for this study were detailed, starting with the descriptive statistics. The descriptive statistics first looked at the analysis of the nominal data, followed by an analysis of the interval data, and lastly, an analysis of the normality of the data.

The descriptive statistics were followed by an analysis of the inferential statistics analysed in this study. The statistical method employed was Structural Equation Modelling (SEM) as this study made use of the conceptual model. Specifically, the PLS-SEM approach of structural equation modelling was used, the justification of which can be found in the Methodology (Chapter 4). The inferential statistics thus began with an analysis of the measurement model in order to assess model reliability and validity. Following this, the structural model was assessed to determine if the model was sound. The results showed that the measurement model was both reliable and valid, and that the structural model was structurally sound. Finally, the overall model and hypotheses were assessed. All the hypotheses could be rejected at the 5%

level of significance and were thus found to be statistically significant, with the exception of H_1 and H_2. The results detailed in this chapter were interpreted and discussed in Chapter 6, in order to draw conclusions and make recommendations with regards to managerial implications, study limitations and future research.

CHAPTER SIX: CONCLUSIONS AND RECCOMENDATIONS

6.1 INTRODUCTION

This chapter serves as the final chapter of this study and details the discussion linking the results (Chapter 5) to the theory discussed in the literature review (Chapters 2 and 3). The conclusions drawn in this discussion were used to answer the research questions of this study as well as provide recommendations in the form of managerial implications. The conclusions drawn were also used to identify the limitations of this study in addition to identifying the areas of possible future research. This chapter begins with an overview of the study detailing a summary of the previous chapters of this study. This is followed by a discussion of the research questions of this study, specifically linking the results to the theory in order to answer the research questions. Thereafter, the managerial implications are detailed followed by a discussion of the limitations of the study and areas of possible future research. Finally, the chapter and the study is concluded in the last section.

6.2 OVERVIEW OF THE STUDY

The purpose of this study was to investigate the relationships between the characteristics of online games, the gameplay experiences of players and the Online Purchase Intent (OPI) of players with regards to In-app Purchases (IAPs). Ultimately, the study aimed to contribute to the field of online consumer behaviour, especially with regard to the influencers of online purchase intent when purchasing virtual goods. The following research questions were thus proposed in order to investigate the research problem:

RQ1: Can the Stimulus Organism Response model be effectively applied to online gaming?

RQ2: Do Skill and Challenge also contribute to the Flow and the Online Purchase Intent of In-app Purchases in online gaming?

RQ3: Which factors of the Stimulus Organism Response model for Online Gaming contributes the most to the Online Purchase Intent of In-app Purchases in online gaming?

The conceptual model used in this study was based on the Stimulus-Organism-Response (S-O-R) model. The S-O-R model was introduced in Chapter 2 and discussed in detail in Chapter 3. The S-O-R model is an environmental psychology model and is used to analyse the mediating effect of emotional responses on the relationship between the environment and an individual's behaviour (Mehrabian & Russel, 1974; Mehrabian & Russel, 1980s). The model is often adapted for use in consumer behaviour (Jacoby, 2002) and one such adaptation, the S-O-R model for SNSs (Huang, 2012) (Figure 3.1) formed the foundations of the conceptual model developed for use in this study.

The S-O-R model for Online Gaming (Figure 3.3) was developed for use in this study by combining elements of the S-O-R model for SNSs and the Flow model (Hoffman & Novak, 2009; Huang, 2012). This included the addition of two constructs, Skill and Challenge (Mathwick & Rigdon, 2004; Hoffman & Novak, 2009).

This chapter, serves as the final chapter of the study and details the discussion of the results found in Chapter 5 and provides managerial implications for these results. This chapter discusses the results in relation to the theory presented in Chapters 2 and 3 in order to answer the research questions of this study. The section to follow details a discussion of the research questions using the results and theory provided in previous chapters. This is followed by a managerial implications which were drawn from the discussion of the research questions. Thereafter, the limitations of the study and areas of future research are discussed before the chapter is concluded.

6.3 CONCLUSION WITH REGARDS TO THE RESEARCH QUESTIONS

This section discusses the results presented in the preceding chapter with constant reference to literature review detailed in Chapters 2 and 3. The discussions presented in this section are directly related to the research questions of the study. Thus, research question 1 details the discussion of the overall model and whether the model is suitable for use in online gaming. Research question 2 details the discussion of the inclusion of the constructs Skill and Challenge, and addresses whether their inclusion in the model is of significance to online gaming. Research question 3 details the discussion of all constructs in the model and which constructs contribute most to the OPI of IAPs in online games.

6.3.1 Research Question 1: Can the Stimulus Organism Response Model be Effectively Applied to Online Gaming?

In order to assess whether a conceptual model is suitable for use as a measurement instrument using PLS-SEM, it is necessary to look to the measurement and structural models. As detailed in Chapter 4, the measurement model is necessary for assessing whether a model reliable and valid, while the structural model is necessary to determine the model fit and analyse the relationships within the model (Anderson & Gerbing, 1982; Savalei & Bentler, 2006).

The reliability of a model is determined through internal consistency reliability and indicator reliability, using the Cronbach's Alpha scores, Composite Reliability scores and outer model loadings (Wong, 2013). The reliability analysis results are detailed in section 5.4.1.1, and determined that the model has both internal consistency reliability and indicator reliability. The model could this be considered reliable.

The validity of the model is determined through convergent and discriminant validity, using the AVE scores, Fornall-Larcker criterion and the cross loadings (Fornall & Larcker, 1981; Wong, 2013; Hair *et al*., 2014). The validity analysis results are detailed

in section 5.4.1.2, and determined that the model has both convergent and discriminant validity. The model could this be considered valid. Thus the analysis of the measurement model determined the model to be both reliable and valid.

The structural model details the fit of the model and the relationships between constructs in the model. The results of the analysis of the structural model can be found in section 5.4.2. The overall fit of the model is determined by an examination of the R^2 values. The analysis of the R^2 determined that both Flow and Affective involvement have a moderate fit, while Online Purchase Intent has a weak fit, and Cognitive Involvement has a very weak fit. Overall, the model could be said to have a weak to moderate fit. However, the path values need to be assessed alongside the R^2 values, as the R^2 values hold less power if the path values are significant (Chin, 1998).

Analysis of path values indicated that four relationships were statistically significant. These were the relationships between Challenge and Flow, Flow and Affective Involvement, Cognitive Involvement and Affective Involvement, and Affective Involvement and Online Purchase Intent. The constructs with low R^2 values, Cognitive Involvement and Online Purchase intent were thus considered acceptable for inclusion in the model as they had significant path values (Chin, 1998).

Lastly, an analysis of the model effect sizes revealed that the model did not differ significantly from the original model. Overall, the analysis of the structural model revealed that the model is stable. Thus, the model was found to be reliable, valid and structurally, indicating that it serves as a suitable instrument for use in the assessing the findings of the model (Wong, 2013). This indicates that the model was effectively applied to online gaming. The S-O-R model for Online Gaming can therefore be considered a suitable model for use in the investigation of OPI in online gaming.

Furthermore, as the S-O-R model is often used in the study of consumer behaviour (Jacoby, 2002), the S-O-R model for Online Gaming is suitable for use in studying the behaviour of players in online games particularly with regards to the way they interact with other players, how they interact with the game and their purchasing intentions for In-App Purchases in online games.

6.3.2 Research Question 2: Do Skill and Challenge also contribute to the Flow and Online Purchase Intent of In-app Purchases in Online Gaming?

The S-O-R model was adapted to online gaming by including two additional constructs, Skill and Challenge (Mathwick & Rigdon, 2004; Hoffman & Novak, 2009). In order to assess whether Skill and Challenge contribute to Flow and subsequently OPI in the S-O-R model for Online Gaming, it is necessary to examine the path values and hypotheses tests related to these constructs. The path values and hypotheses tests are detailed in section 5.4.3. Path values are considered significant if they are greater than 0.2 or less than -0.2 (Wong, 2013). Additionally, path values closer to +1

or -1 are considered to be strong relationships while path values closer to 0 are considered to be weak relationships (Garson, 2016).

Statistical analysis revealed that the path value for Skill to Flow was positive but not significant. The hypothesis test for Skill (*H_4: Skill has a positive influence on Flow*) could reject H0 at the 5% level of significance, thus Skill was revealed to have positive influence on Flow. As such, while Skill was shown to have a positive relationship with Flow, the relationship was not statistically significant in the model. It can therefore be concluded that Skill does not contribute to Flow in the S-O-R model for Online Gaming, and subsequently does not contribute to the OPI of IAPs in online games.

The path value for Challenge to Flow revealed that the relationship was positive and significant but the relationship was revealed to be weak to moderate in strength. The hypothesis test for Challenge (*H_5: Challenge has a positive influence on Flow*) could reject H0 at the 5% level of significance, thus Challenge was revealed to have positive influence on Flow. The relationship between Challenge and Flow is statistically significant in the model. Therefore, it can be concluded that Challenge does contribute to Flow in the S-O-R model for Online Gaming, and subsequently does contribute to the OPI of IAPs in online games. Additionally, Challenge contributes positively to Flow indicating that greater Challenge in online games results in a greater Flow experience, and subsequently a greater OPI for IAPs in online games.

Thus in answering the second research question of this study, it was determined that Skill does not contribute to Flow and OPI of IAPs while Challenge contributes positively to Flow and OPI of IAPs in the S-O-R model for Online Gaming.

The differences in results for Skill and Challenge however, is unusual in that the theory discussed in section 3.3 proposes that Skill and Challenge have a congruent relationship and work together to influence Flow (Hoffman & Novak, 1996; Mathwick & Rigdon, 2004). The difference may arise due to the Skill being difficult to quantify in an online environment as opposed to physical skills (Mathwick & Rigdon, 2004). The theory also states that if either of Skill or Challenge are greater than the other, it may lead to anxiety or boredom for game players. The means for Skill and Challenge (section 5.3.2) showed that most respondents were neutral to the importance of both in online games. Thus it is unclear why Skill was not significant, and further research may be necessary.

6.3.3 Research Question 3: Which Factors of the Stimulus Organism Response Model for Online Gaming contributes the most to the Online Purchase Intent of In-app Purchases in Online Gaming?

In order to determine which factors (constructs) contribute most to the OPI of IAPs in the S-O-R model for Online Gaming, each factor was examined based on the sequence of their corresponding hypothesis. Each factor is discussed in terms of the associated path values and hypothesis tests.

Active control refers to the ability of an individual to choose who they interact with, when to interact and which information to take in when engaging in an online space (Lowry *et al.*, 2006). The path value for Active Control was found to be positive but was not significant. Additionally, the hypothesis test (*H_1: Active Control has a positive influence on Flow*) failed to reject H_0 at the 5% significance level and thus Active Control was found to not have an influence on Flow. The mean for Active Control indicated that the majority of respondents agreed that Active Control is important to online games and thus game players may find it important to control how they interact with a game. However, while Active Control is deemed to be important to game players, it does not contribute to the Flow experience and immersion in the game. Active Control therefore does not contribute to the OPI of IAPs in online games.

Reciprocal Communication, the second interactivity measure, refers to the ability to communicate between two or more entities (Jiang *et al.*, 2010). Reciprocal Communication also had a positive path value but was not significant. The hypothesis test (*H_2: Reciprocal Communication has a positive influence on Flow*) failed to reject H_0 at the 5% significance level and thus Reciprocal Communication was found to not have an influence on Flow. Reciprocal Communication therefore does not contribute to the OPI of IAPs in online games. The mean for Reciprocal Communication indicated that the majority of respondents were neutral to the importance of Reciprocal Communication in online games. Therefore, it can be concluded that players of online games do not feel it is important to be able to communicate with other players in games. This implies players may prefer to play games alone.

In online games, Social Identity would refer to a player's ability to relate to player groups, the ability to join player groups and the level of commitment to a specific player group. These player groups are often referred to as 'guilds' and players within the group work together to accomplish game objectives (Debeauvais *et al*., 2012; Narinen, 2014). The path value for Social Identity indicated a positive relationship but was not significant. Therefore, Social Identity does not contribute to the OPI of IAPs in online games. The hypothesis test (*H_3: Social Identity has a positive influence on Flow*) could reject H_0 at the 5% significance level and thus Social Identity was found to have a positive influence on Flow. The mean for Social Identity indicated that the majority of respondents were neutral to the importance of Social Identity in online games. It can therefore be concluded that players of online games may not feel the need to join any player groups and may prefer to play alone. This conclusion is further supported by similar conclusions for Reciprocal Communication. Indeed, since many IAPs only benefit the individual player, many players may not want to spend money on games if it only benefits others. Thus, players may choose to focus on their own game experience as opposed to a team play experience.

Skill (*H_4: Skill has a positive influence on Flow*) and Challenge (*H_5: Challenge has a positive influence on Flow*) were discussed in section 6.3.3 above. Skill was found to not have a significant relationship with Flow, while Challenge was found to have a

significant positive relationship with Flow. It was also concluded that Skill does not contribute to Flow and OPI of IAPs while Challenge contributes positively to Flow and OPI of IAPs in the S-O-R model for Online Gaming.

Flow was seen as being an engrossing and enjoyable experience that could lead to the development of positive emotions while in a state of flow (Hoffman & Novak, 1996; Huang, 2003; Guo & Barnes, 2009). In the S-O-R model for Online Gaming, Flow influences both Cognitive Involvement (*H_6: Flow has a positive influence on Cognitive Involvement*) and Affective Involvement (*H_7: Flow has a positive influence on Affective Involvement*). The path values indicate that Flow has positive relationships with both Cognitive Involvement and Affective Involvement but only the relationship with Affective Involvement was significant. The hypothesis test for H_6 could reject H_0 at the 5% significance level and thus Flow was found to have a positive influence on Cognitive Involvement. The hypothesis test for H_7 could reject H_0 at the 5% significance level and thus Flow was found to have a positive influence on Affective Involvement. The mean for Flow indicated that the majority of respondents agreed that the Flow experience is important to online games. It can therefore be concluded that the Flow experience is important to player of online games, and that greater immersion into gameplay can result in greater involvement with a game on an emotional level and thus greater game enjoyment. Given that Challenge has a significant positive relationship with Flow, games that offer players greater Challenge may result in greater immersion into game. Overall, it can be concluded that Flow does contribute to the OPI of IAPs in online games.

When applied to online games, Cognitive involvement can be seen as the thought processes involved and what players think while playing a game (Celsi & Olsen, 1988; Putrevu & Lord, 1994). Affective involvement in online games can be seen as the emotions elicited while playing a game and the emotional connection to a game once it has been played (Celsi & Olsen, 1988; Putrevu & Lord, 1994). In the S-O-R model for online gaming, Cognitive Involvement is theorized to influence Affective Involvement (*H_8: Cognitive Involvement has a positive influence on Affective Involvement*) as cognition and emotion generation are shown to be linked (Isen, 1993; Roseman & Smith, 2001; O'Regan, 2003). The path values indicate that Cognitive Involvement has a significant, positive relationship with Affective Involvement. Additionally, the relationship is shown to be the strongest relationship in the model (Garson, 2016). The hypothesis test could reject H_0 at the 5% significance level and thus Cognitive Involvement was found to have a positive influence on Affective Involvement. Thus it can be concluded that game players' thought processes during gameplay may trigger positive emotions in players. However, Cognitive Involvement does not have a significant relationship with Flow. Thus, the results indicate that immersion into the gameplay experience may trigger positive emotions in players but not change the way players think of the game. Therefore, it can be concluded that Cognitive Involvement does contribute to the OPI of IAPs in online games but only through it its influence on emotions.

The final hypothesis for the S-O-R model theorises that Affective Involvement positively influences OPI (*H_9: Affective Involvement has a positive influence on Online Purchase Intention*). The path values indicate that Affective Involvement has positive and significant relationship with OPI. The hypothesis test could reject H_0 at the 5% significance level and thus Affective Involvement was found to have a positive influence on OPI. The S-O-R model for SNSs also indicated that Affective Involvement has a significant positive relationship with OPI (Huang, 2012). It can therefore be concluded that a players emotional responses to playing a game may influence their decision to make IAPs in online games. This is supported by previous literature discussed in Chapter 3 (Hahl, 2014) which proposes that a player in an online game may be more likely to make IAPs when experiencing positive emotions. Overall, it can thus be concluded that Affective Involvement does contribute to the OPI of IAPs in online games.

From the discussion above, the factors contributing to the OPI of IAPs in online games are Challenge, Flow, Cognitive Involvement and Affective Involvement. Thus online games providing significant Challenge to game player might lead to greater immersion into the gameplay experience which in turn may lead to lead to greater involvement with a game, in terms of how a player feels about the game. Additionally, greater immersion into a game may be more likely to result in positive emotions than positive thought. However, if players have positive thoughts regarding a game it may trigger further positive emotions related to the game. Finally, greater positive emotional involvement may lead to players to be more likely to make IAPs in online games. As the findings indicate that greater involvement with a game triggers emotions and not greater thought, the strong emotional link to OPI may imply that making IAPs are impulse purchases.

The factors Active Control, Reciprocal Communication, Social Identity and Skill were found to not contribute to the OPI of IAPs in online games. Thus players in online games may prefer to play games alone, and are not concerned with Skill levels when playing a game. Skill and Challenge are related to the competitive aspects of gameplay (Mathwick & Rigdon, 2004). Thus, players of online games may not play for competitive reasons but rather for enjoyment and relaxation. This conclusion is further supported by the factors which do contribute to the OPI of IAPs in online games, namely Flow and Affective Involvement. IAPs made in online games may thus be due to wanting to enjoy the gaming experience further.

Finally, it is important to note that the majority of respondents (98.1%) were residents of South Africa and were between the ages of 18 – 25 (82.2%). Thus, the conclusions drawn in this study may be most relevant to young adult, South African players of online games. Research into online gaming in South Africa is very limited and, as the gaming industry is rapidly growing and highly profitable, it is necessary to explore the industry in a South African context. Given the findings of the study and the discussion above, South African player of online games may prefer to play games alone as

opposed to group play, and they may play games as a way to relax and enjoy themselves as opposed to playing competitively

The conclusions drawn in the discussions of the research questions may have important implications for industry and academia. The managerial implications of the results of this study are discussed in the next section.

6.4 MANAGERIAL IMPLICATIONS

The discussion presented in the previous section revealed several important insights which have implications for marketers both in industry and academia.

Firstly, this study developed a conceptual model for use in online gaming. The model was shown to be reliable, valid and structurally sound, and was thus a suitable instrument for use in the analysis of the OPI of IAPs in online games. The study thus developed a theoretically sound model which marketers in both academia and industry can use to evaluate the OPI of IAPs in online games. The model can be used to assess the behaviours of players in online games, thus assisting both game developers and marketers in producing and marketing online games. Furthermore, as the extant literature on online gaming and the OPI of IAPs is quite limited, particularly in the South African context, this study builds on the existing literature and provides new insight into online gaming in South Africa. Game developers and marketers seeking to bring new online games into South Africa can thus make use of the managerial implications discussed below.

Secondly, the study set out to determine which factors contributed the most to OPI in the S-O-R model for Online Gaming. It was concluded that the factors Challenge, Flow, Cognitive Involvement and Affective Involvement contribute most to OPI, while Active Control, Reciprocal Communication, Social Identity and Skill do not contribute to OPI. Thus, players are more likely to make IAPs when they are enjoying the gameplay experience, and are free from concerns of social interaction and competition. As such games should focus maximising the enjoyment of the gameplay experience for the individual player in order to increase the chance of player making IAPs.

When creating games, the findings of the study suggest that it may be best to focus on the challenge a game provide to players. A more challenging game may lead players to become more immersed in the game, thus spending more time playing and increasing the opportunities to make IAPs. Greater immersion in a game may also foster greater game enjoyment, thus increasing the chances of players making IAPs during the course of gameplay. It is important to note however, that Skill and Challenge have a congruent relationship (Hoffman & Novak, 1996; Mathwick & Rigdon, 2004), and when one is greater than the other, it may lead to boredom or anxiety during gameplay. Players who feel bored or anxious may quit the game out of frustration resulting in lost opportunities for making IAPs. Thus when setting Challenges for

players in games, it is necessary to ensure that players can still complete those Challenges. Furthermore, as the study found that Skill was not considered especially important to playing online games, setting Challenges at the correct level may be necessary to retain players who don't believe in building gaming skill.

When promoting IAPs during the course of gameplay, it is suggested that the promotions focus on emotional appeals as emotion is shown to have a strong influence on OPI. The results of the study indicate that IAPs are impulse purchases influenced by positive emotions triggered during gameplay. Furthermore, the findings indicate that gamers play online games for the enjoyment of the play experience rather than for competitive gameplay. Therefore, it is suggested to also link promotions of IAPs to heightened game enjoyment. For example, if a game promotes the sale of additional player lives (Hahl, 2014), it is suggested that the promotion details how it could improve and lengthen the gameplay experience, thus increasing game enjoyment.

The findings of the study implied that players of online games prefer to play games alone, as respondents did not find the need to communicate with other players or join gaming communities as important to the gameplay experience. Since many IAPs only benefit the individual player rather than team play, players may become more self-focused as they spend money to improve their own gaming experience. Thus, it is suggested that games and game promotions focus on the individual rather than groups, as it may result in greater game enjoyment. Games should allow players to complete in game tasks without the assistance of other players and IAPs should be more focused towards benefiting the individual player experience rather than a group player experience. This in turn would increase the likelihood of players making IAPs during the course of gameplay.

Additionally, the findings of this study also provide insight on the online gaming industry in South Africa. As such, game developer and marketers releasing new games in South Africa should appeal to the South African online gaming community by focusing on the individual and promoting games as a way to relax and unwind. Online games should be made to be seen as a way to escape the stresses of everyday life and allow players time to themselves as they immerse themselves in a game. This may attract more South African players to online games, providing more opportunities for IAPs to be made.

The implications detailed above may be useful to marketers but should be noted with the limitations of the study in mind. These limitations are detailed in the following section.

6.5 LIMITATIONS OF THE STUDY

This study faced several limitations namely: Firstly, the sample of this study comprised University of Cape Town (UCT) students as the UCT mailing lists were used to collect data. The sample can therefore be considered biased towards UCT students. It should

be noted however, that not all UCT students are residents of the same city and thus the sample may still be representative of South Africa. The sample however, was shown to be similar to the samples used in previous studies (Krotoski, 2004; Voikunsky *et al.*, 2005; Cole & Griffiths, 2007; Yee, 2007) in terms of the gender and age of respondents. While the sample was shown to play online games less than the average, the average play time is said to differ for different countries (Krotoski, 2004; Cole & Griffiths, 2007).

Secondly, the sample used in this study was selected using non-probability sampling techniques. When non-probability sampling techniques are used in quantitative research, there is concern that the sample may not be accurately representative of the true population (Malhotra, 2010). This is because the precision of the sample results cannot be objectively evaluated as it can with probability sampling techniques (Malhotra, 2010). Thus, the sample may not be representative of the population and could influence the generalizability of the results.

The third limitation of this study was the inclusion of all types of online games with IAP functionality in the sample of respondents. The findings of this study are thus generalisable to online games in general but not to specific types of online games. As shown in Table 2.1, there are several categories of F2P games which are played on a variety of platforms including computers, laptops, cell phones and tablets (Hahl, 2014). The study focuses on games which are competitive in nature and provide IAPs which enhance the competitive nature of the game (Mathwick & Rigdon). Thus, some game categories were excluded from the study and no single gaming platform was focused on. Therefore, given that there are many types of games and gaming platforms, the findings of this study may be limited in the games it can be applied to. Mobile games in particular are shown to be popular and the mobile gaming market is experiencing rapid growth (Soh & Tan, 2008). Thus, the study of the specific platforms in gaming may be necessary.

6.6 FUTURE RESEARCH

The discussion of the research questions (section 6.3) and study limitations (section 6.5) revealed several areas of possible future research.

Firstly, the findings indicated that Skill had no significant relationship with Flow but that Challenge did. Extant literature proposes that Skill and Challenge have a congruent relationship and work together to influence Flow (Hoffman & Novak, 1996; Mathwick & Rigdon, 2004). The results of this study thus show a contradiction to the relationship between Skill and Challenge, and as is discussed in section 6.3.2, it is unclear why Skill is not significant but Challenge is. Thus, future research may look into why the proposed relationship did not hold true in the S-O-R model for Online Games, and why Skill is not considered important to the gameplay experience.

Secondly, the study found that emotion had a strong influence on the OPI of IAPs in online games. The relationship was positive such that heightened emotions may lead to more IAPs made during gameplay. Emotions are however, quite complex and comprise many emotions, each of which can have different influences (Roseman & Smith, 2001). Therefore, future research may look into which specific emotions are triggered during gameplay and which have the greatest influence on the OPI of IAPs in online games. It may also be necessary to look into why those emotions are considered important to the gameplay experience.

Third, the study also found that emotion was closely linked to OPI such that making IAPs in online games may be impulse purchases. Thus, future research may look into whether these purchases are indeed impulse purchases and how they are related to emotions.

Lastly, the study found that players of online games may prefer to play online games alone and don't consider the ability to communicate with other players or joining player groups to be important to gameplay. Many online games however, incorporate social and communication features into the game and use it as part of gameplay (Novak *et al*., 2000; Debeauvais *et al*., 2012; Narinen, 2014). Thus, future research may look into why player of online games may prefer to play games alone when games do incorporate social play aspects into games.

6.7 CONCLUSION

This study set out to investigate the relationships between the characteristics of online games, the gameplay experiences of players and the OPI of players with regards to IAPs. The study developed a conceptual model, the S-O-R model for Online Games, to investigate the study research questions. It was found that the greatest contributors to the OPI of IAPs in online games was the challenge presented by a game, and the ability of player to become more immersed and involved with a game on a cognitive and emotional level. Furthermore, it was concluded that consumers may play online games for enjoyment rather than competition, and thus may make IAPs in order to increase the enjoyment of gameplay. This chapter began with a brief overview of the study in order to orientate the reader to the discussions which followed. The chapter then detailed a discussion of the three research questions of the study in terms of the conclusions which could be drawn from the results of the study. It was concluded that the conceptual model used in the study was suitable for use in the study of online gaming, and the factors which contributed to the OPI of IAPs in online games were identified and discussed. Following this, the chapter detailed the managerial implications of the insights drawn in the discussion of the research questions. Thereafter, the chapter detailed the limitations of the study and areas of possible future research before concluding the study.

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APPENDIX A

MEASUREMENT INSTRUMENT

UNIVERSITY OF CAPE TOWN
FACULTY OF COMMERCE
Igniting Knowledge and Opportunity

Questionnaire Number:

To the respondent:

This research questionnaire is conducted by a Master of Business Science (Marketing) student at the University of Cape Town, and is used to investigate the motivations behind In-app purchases in online games. This research has been approved by the Commerce Faculty Ethics in Research Committee.

Your **participation in this research is voluntary**. You can choose to withdraw from the research at any time. Due to the nature of the study you will need to provide the researcher with some form of identifiable information however, **all responses will be confidential** and used for the purposes of this research only.

The questionnaire will take approximately **10 minutes** to complete.

Should you have any questions regarding the research you may contact the following persons:

Researcher: Mr Ozayr Mathews (ozayrmathews@gmail.com)

Supervisor: Dr Elsamari Botha (elsamari.botha@uct.ac.za)

NB: This research revolves around the study of Massively Multiplayer Online (MMO) games and the In-app purchases made in these games. In-app Purchases are purchases of virtual goods (game items and bonuses) for real world money.

Please answer the following questions related to MMO gaming by placing an X in the appropriate box, as shown below:

Example:	1	2	3	4	5	6	7
Q1			**X**				

1. Do you play any MMO games/Do you play any games with In-app purchases?

Yes	
No	

2. If yes, please indicate which games you play (multiple responses are allowed for this question):

Game:	
World of Warcraft	
Star Wars: The Old Republic	
The Elder Scrolls: Online	
Tera: Fate of Arun	
Wakfu	
Other/s (please specify below):	
-	
-	

From this point forward, please answer the following questions with regards to only one of the above games (i.e. your favourite game or the game played most often). Please specify which game you have chosen:
……..

3. How much time (on average) do you spend playing online games each week?

7 Hours or less	7 - 15 hours	15 – 20 hours	20 – 25 hours	25+ Hours

Please indicate your level of agreement with the following statements:	**Strongly Disagree**	**2**	**3**	**4**	**Strongly Agree**
4. I am aware of where I am while playing the game	1	2	3	4	5
5. The game offers me control over what I want to do	1	2	3	4	5
6. The game allows me to freely choose with whom I wish to interact	1	2	3	4	5
7. The game facilitates two-way communication	1	2	3	4	5
8. The game makes me feel like it wants to listen to its members	1	2	3	4	5
9. The game enables conversation amongst members	1	2	3	4	5
10. The game facilitates my feelings of belongingness toward the online group	1	2	3	4	5
11. The game enables me to create a good image of the online group	1	2	3	4	5

12. The game makes me feel I am a valuable member of the online group	1	2	3	4	5
13. I am absorbed in my interaction with the game	1	2	3	4	5
14. My creativity if aroused when I interact with the game	1	2	3	4	5
15. It is fun to interact with the game	1	2	3	4	5
16. Using virtual goods in the game is interesting	1	2	3	4	5
17. Using virtual goods in the game is exciting	1	2	3	4	5
18. Using virtual goods in the game is appealing	1	2	3	4	5
19. Using virtual goods in the game is important	1	2	3	4	5
20. Using virtual goods in the game is relevant	1	2	3	4	5
21. Using virtual goods in the game is valuable	1	2	3	4	5
22. I am like to consider the purchase of virtual currency from the game	1	2	3	4	5
23. I am likely to consider the purchase of virtual items from the game	1	2	3	4	5
24. I am likely to consider the purchase of virtual goods from the game	1	2	3	4	5

Please indicate your level of agreement with the following statements:	**Strongly Disagree**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Strongly Agree**
25. I am extremely skilled at playing the game	1	2	3	4	5	6	7	8	9
26. I consider myself knowledgeable about how to play the game well	1	2	3	4	5	6	7	8	9
27. I know somewhat less than most players in the game (R)	1	2	3	4	5	6	7	8	9
28. I know how to find what I am looking for in the game	1	2	3	4	5	6	7	8	9
29. How would you rate your skill at playing the game, compared to other things you do on a computer?	1	2	3	4	5	6	7	8	9
30. How would you rate your skill at playing the game, compared to the sport or game you are best at?	1	2	3	4	5	6	7	8	9
31. Playing the game challenges me	1	2	3	4	5	6	7	8	9
32. Playing the game challenges me to perform to the best of my ability	1	2	3	4	5	6	7	8	9
33. Playing the game provides a good test of my skills	1	2	3	4	5	6	7	8	9
34. I find that playing the game stretches my capabilities to my limit	1	2	3	4	5	6	7	8	9
35. How much does the game challenge you, compared to other things you do on a computer?	1	2	3	4	5	6	7	8	9
36. How much does the game challenge you, compared to the sport or game you are best at?	1	2	3	4	5	6	7	8	9

Please answer the following questions by marking the appropriate box with an X where applicable *(responses are anonymous and confidential)***:**

37. What is your | | **age?**

38. What is your gender?

Male	Female

39. What is your current country of residence?

Country:	
United States of America	
The United Kingdom	
South Africa	
Other (please specify below):	
-	

Thank you for your time, have a lovely day!

APPENDIX B

APPROVED ETHICS APPLICATION

I certify that I have read the the Commerce Faculty Ethics in Research policy (http://www.commerce.uct.ac.za/Pages/ComFac-Downloads)	☒

I hereby undertake to carry out my research in such a way that

- there is no apparent legal objection to the nature or the method of research; and
- the research will not compromise staff or students or the other responsibilities of the University;
- the stated objective will be achieved, and the findings will have a high degree of validity;
- limitations and alternative interpretations will be considered;
- the findings could be subject to peer review and publicly available; and
- I will comply with the conventions of copyright and avoid any practice that would constitute plagiarism.

Signed by:

	Full name and signature	Date
Principal Researcher/Student:	Ozayr Mathews 	12/10/2015

This application is approved by:

Supervisor		13/10/2015
HOD (or delegated nominee – for all Honours Projects):		16/11/2015
Chair: Faculty EIR Committee (only for postgraduate research at Master and PhD level)		26.11.2015

APPENDIX C

DSA APPROVAL

	RESEARCH ACCESS TO STUDENTS	DSA 100

NOTES

1. This form must be **FULLY** completed by all applicants that want to access UCT students for the purpose of research.
2. Return the fully completed **(a) DSA 100** application form **by email**, in **the same word format**, together with your: **(b) research proposal inclusive of your survey, (c) copy of your ethics approval letter / proof (d) informed consent letter** to: Moonira.Khan@uct.ac.za. You application will be attended to by the Executive Director, Department of Student Affairs (DSA), UCT.
3. The turnaround time for a reply is **approximately** 10 working days.
4. **NB:** It is the responsibility of the researcher/s to apply for and to obtain **ethics approval and to comply with amendments that may be requested;** as well as to **obtain** approval to access UCT staff and/or UCT students, from the following, at UCT, respectively: (a) **Ethics:** Chairperson, Faculty Research Ethics Committee' (FREC) for ethics approval, (b) **Staff access:** Executive Director: HR for approval to access UCT staff, and (c) **Student access:** Executive Director: Student Affairs for approval to access UCT students.
5. **Note:** UCT Senate Research Protocols requires compliance to the above, **even if prior approval has been obtained from any other institution/agency. UCT's research protocol requirements applies to all persons, institutions and agencies from UCT and external to UCT who want to conduct research on human subjects for academic, marketing or service related reasons at UCT.**
6. **Should approval be granted to access UCT students for this research study, such approval is effective for a period of one year from the date of approval (as stated in Section D of this form), and the approval expires automatically on the last day.**
7. **The approving authority reserves the right to revoke an approval based on reasonable grounds and/or new information.**

SECTION A: RESEARCH APPLICANT/S DETAILS

Position	Staff / Student No	Title and Name	Contact Details (Email / Cell / land line)
A.1 Student Number	MTHOZA001	Mr Ozayr Mathews	ozaymathews@gmail.com /076 982 8111 / 021 712 8354
A.2 Academic / PASS Staff No.			
A.3 Visitor/ Researcher ID No.			
A.4 University at which a student or employee	University of Cape Town	Address if not UCT:	
A.5 Faculty/ Department/School	Commerce/Department of Management Studies/School of Marketing		
A.6 APPLICANTS DETAILS if different from above	Title and Name	Tel.	Email

SECTION B: RESEARCHER/S SUPERVISOR/S DETAILS

Position	Title and Name	Tel.	Email
B.1 Supervisor	Dr Elsamari Botha		Elsamari.botha@uct.ac.za

SECTION C: APPLICANT'S RESEARCH STUDY FIELD AND APPROVAL STATUS

C.1 Degree – if applicable	Master of Business Administration (Marketing)
C.2 Research Project Title	Investigating the Factors That Contribute to In-App Purchases in Online Gaming: The Stimulus-Organism-Response Model
C.3 Research Proposal	Attached: Yes ■ No ☐
C.4 Target population	The target population for this study are players of online social games in which it is possible to make in-app purchases (IAPs) – a virtual purchase for real money. There is no specific population that plays online games but a large percentage fall into the age group for the average student (Mean=23.6, SD=7.6). Since IAPs require adult consent, respondents need to be 18 or older.
C.5 Lead Researcher details	If different from applicant:
C6. Will use research assistant/s	Yes ☐ No ■ If yes- provide a list of names, contact details and duties
C.7 Research Methodology and Informed consent:	Research methodology: The questionnaire will be translated to an online form using the electronic survey platform Qualtrics. The survey will then be distributed to respondents via social media platforms, mainly Facebook, below. Informed consent: Anonymous questionnaire
C.8 Ethics clearance status from UCT's Faculty Ethics Research Committee (FREC)	Approved by the FREC Yes ■ With amendments: Yes ☐ No ■ (a) Attach copy of your ethics approval. Attached: Yes (b) State date and reference no. of ethics approval: Date:08/12/2015 Ref. No.: 1410201501

SECTION D: APPLICANT/S APPROVAL STATUS FOR ACCESS TO STUDENTS FOR RESEARCH PURPOSE

(To be completed by the ED, DSA or Nominee)

	Approved / With Terms / Not	* Conditional approval with terms	Applicant/s Ref. No.:
D.1 APPROVAL STATUS	(i) Approved ■ (ii) With terms ~~(iii) Not approved~~	(a) Access to students for this research study must only be undertaken after written ethics approval has been obtained. (b) In event any ethics conditions are attached, these must be complied with before access to students.	MTHOZA001/ Mr Ozayr Mathews

D.2 APPROVED BY:	Designation	Name	Signature	Date of Approval
	Executive Director Department of Student Affairs	*Dr Moonira Khan*		19 January 2016

APPENDIX D

OUTER MODEL LOADINGS

	ACTIVE CONTROL	AFFECTIVE INVOLVEMENT	CHALLENGE	COGNITIVE INVOLVEMENT	FLOW	ONLINE PURCHASE INTENT	RECIPROCAL COMMUNICATION	SKILL	SOCIAL IDENTITY
AC2	0.910								
AC3	0.785								
AI1		0.881							
AI2		0.915							
AI3		0.890							
CH1			0.824						
CH2			0.902						
CH3			0.923						
CH4			0.883						
CH5			0.753						
CH6			0.722						
CI1				0.881					
CI2				0.922					
CI3				0.899					
FL1					0.766				
FL2					0.820				
FL3					0.721				
OPI1						0.935			
OPI2						0.971			
OPI3						0.977			
RC1							0.870		
RC2							0.768		
RC3							0.844		
SI1									0.897
SI2									0.829
SI3									0.864
SK1								0.792	
SK2								0.862	
SK3								0.407	
SK4								0.619	
SK5								0.780	
SK6								0.721	

APPENDIX E

FORNALL-LARCKER CRITERION

	ACTIVE CONTROL	AFFECTIVE INVOLVEMENT	CHALLENGE	COGNITIVE INVOLVEMENT	FLOW	ONLINE PURCHASE INTENT	RECIPROCAL COMMUNICATION	SKILL	SOCIAL IDENTITY
ACTIVE CONTROL	**0.850**								
AFFECTIVE INVOLVEMENT	0.149	**0.895**							
CHALLENGE	0.303	0.149	**0.838**						
COGNITIVE INVOLVEMENT	0.142	0.480	-0.071	**0.901**					
FLOW	0.277	0.366	0.461	0.168	**0.770**				
ONLINE PURCHASE INTENT	0.095	0.353	0.080	0.143	0.183	**0.961**			
RECIPROCAL COMMUNICATION	0.458	0.210	0.351	0.064	0.313	0.175	**0.829**		
SKILL	0.244	0.124	0.236	-0.007	0.281	0.130	0.131	**0.713**	
SOCIAL IDENTITY	0.344	0.296	0.339	0.148	0.357	0.190	0.577	0.142	**0.864**

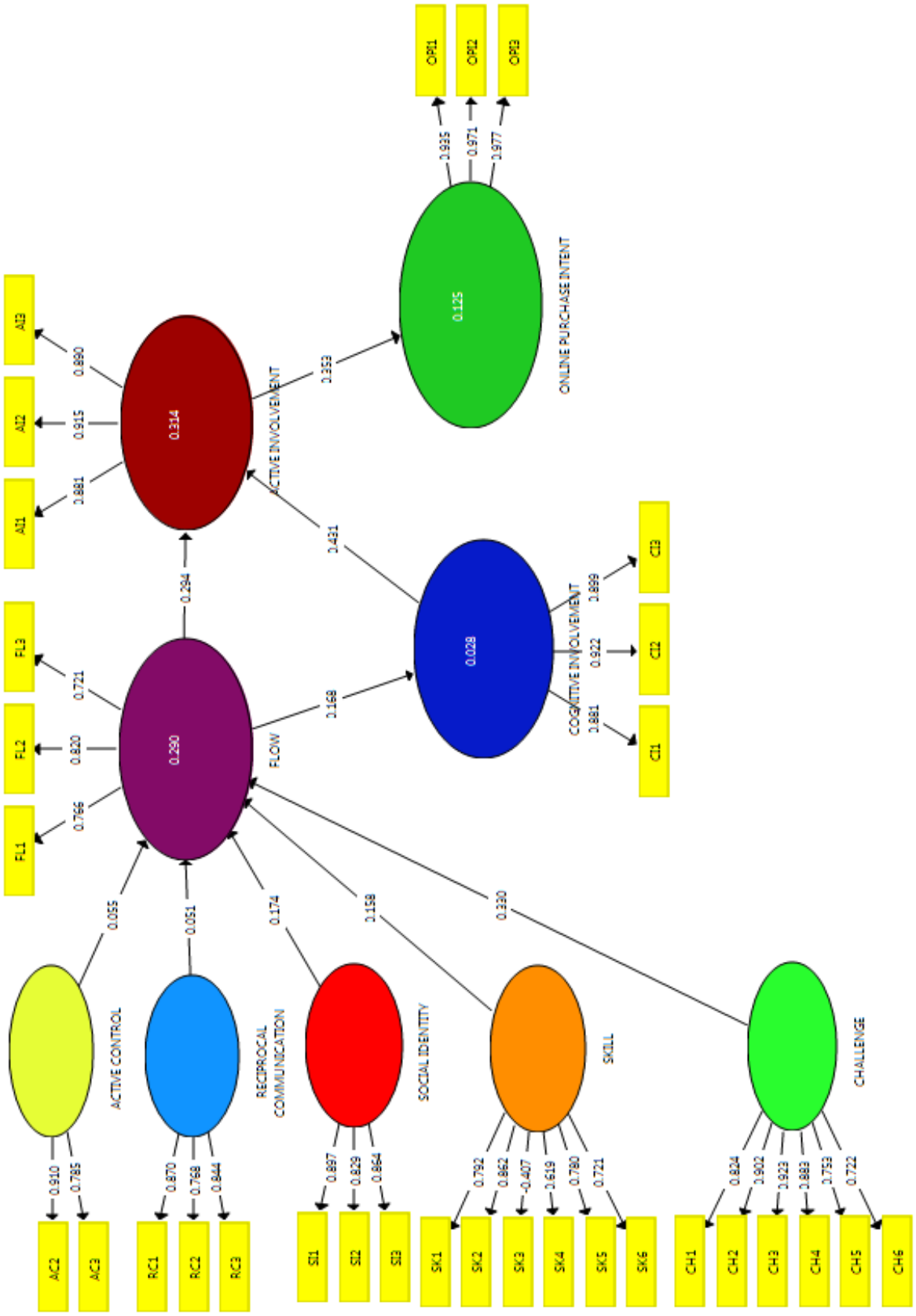
APPENDIX F

CROSS LOADINGS

	ACTIVE CONTROL	AFFECTIVE INVOLVEMENT	CHALLENGE	COGNITIVE INVOLVEMENT	FLOW	ONLINE PURCHASE INTENT	RECIPROCAL COMMUNICATION	SKILL	SOCIAL IDENTITY
AC2	**0.910**	0.108	0.326	0.044	0.275	0.075	0.353	0.249	0.236
AC3	**0.785**	0.158	0.162	0.238	0.183	0.091	0.455	0.151	0.386
AI1	0.118	**0.881**	0.051	0.435	0.289	0.282	0.199	0.110	0.319
AI2	0.117	**0.915**	0.150	0.431	0.369	0.305	0.211	0.110	0.261
AI3	0.163	**0.890**	0.194	0.424	0.322	0.360	0.154	0.112	0.219
CH1	0.288	0.143	**0.824**	-0.040	0.355	0.010	0.284	0.122	0.275
CH2	0.304	0.155	**0.902**	-0.055	0.487	0.066	0.371	0.270	0.332
CH3	0.267	0.156	**0.923**	-0.065	0.465	0.078	0.319	0.263	0.328
CH4	0.242	0.131	**0.883**	-0.067	0.409	0.091	0.255	0.197	0.235
CH5	0.227	0.120	**0.753**	-0.054	0.275	0.108	0.313	0.156	0.285
CH6	0.161	-0.022	**0.722**	-0.096	0.209	0.057	0.188	0.115	0.246
CI1	0.086	0.374	-0.109	**0.881**	0.125	0.043	0.016	-0.023	0.127
CI2	0.094	0.459	-0.065	**0.922**	0.142	0.141	0.086	-0.033	0.120
CI3	0.195	0.455	-0.027	**0.899**	0.182	0.186	0.064	0.033	0.153
FL1	0.176	0.286	0.378	0.095	**0.766**	0.289	0.241	0.172	0.235
FL2	0.228	0.299	0.415	0.082	**0.820**	0.085	0.273	0.240	0.377
FL3	0.237	0.260	0.260	0.225	**0.721**	0.055	0.205	0.237	0.194
OPI1	0.083	0.343	0.071	0.148	0.156	**0.935**	0.150	0.102	0.175
OPI2	0.091	0.337	0.092	0.132	0.203	**0.971**	0.182	0.156	0.183
OPI3	0.100	0.339	0.069	0.131	0.170	**0.977**	0.172	0.116	0.189
RC1	0.438	0.111	0.325	0.020	0.278	0.120	**0.870**	0.163	0.461
RC2	0.377	0.253	0.281	0.140	0.255	0.180	**0.768**	0.058	0.472
RC3	0.314	0.163	0.261	0.000	0.243	0.136	**0.844**	0.100	0.504
SI1	0.274	0.279	0.304	0.102	0.336	0.193	0.555	0.103	**0.897**
SI2	0.328	0.214	0.276	0.171	0.258	0.093	0.551	0.148	**0.829**
SI3	0.299	0.267	0.298	0.122	0.323	0.192	0.403	0.123	**0.864**
SK1	0.179	0.028	0.122	-0.010	0.153	0.059	0.129	**0.792**	0.128
SK2	0.226	0.102	0.183	-0.039	0.254	0.096	0.151	**0.862**	0.088
SK3	0.007	-0.011	-0.055	-0.098	-0.009	-0.055	0.002	**0.407**	-0.005
SK4	0.225	0.111	0.110	-0.072	0.176	0.104	0.132	**0.619**	0.074
SK5	0.182	0.066	0.226	0.006	0.211	0.084	0.079	**0.780**	0.172
SK6	0.115	0.140	0.219	0.070	0.235	0.133	0.019	**0.721**	0.081

APPENDIX G

PLS ALGORITHM MODEL


OP1
OP2
OP3
0.935
0.971
0.977
0.125
ONLINE PURCHASE INTENT
0.353
A3
A2
A1
0.890
0.915
0.881
0.314
ACTIVE INVOLVEMENT
0.431
0.284
FL3
FL2
FL1
0.721
0.820
0.766
0.290
FLOW
0.168
0.028
COGNITIVE INVOLVEMENT
CI3
CI2
CI1
0.899
0.922
0.881
0.055
0.051
0.174
0.159
0.330
AC2
AC3
0.910
0.785
ACTIVE CONTROL
RC1
RC2
RC3
0.870
0.768
0.844
RECIPROCAL COMMUNICATION
SI1
SI2
SI3
0.897
0.829
0.864
SOCIAL IDENTITY
SK1
SK2
SK3
SK4
SK5
SK6
0.792
0.862
-0.407
0.619
0.780
0.721
SKILL
CH1
CH2
CH3
CH4
CH5
CH6
0.824
0.902
0.923
0.883
0.753
0.722
CHALLENGE